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Photograph by Malak

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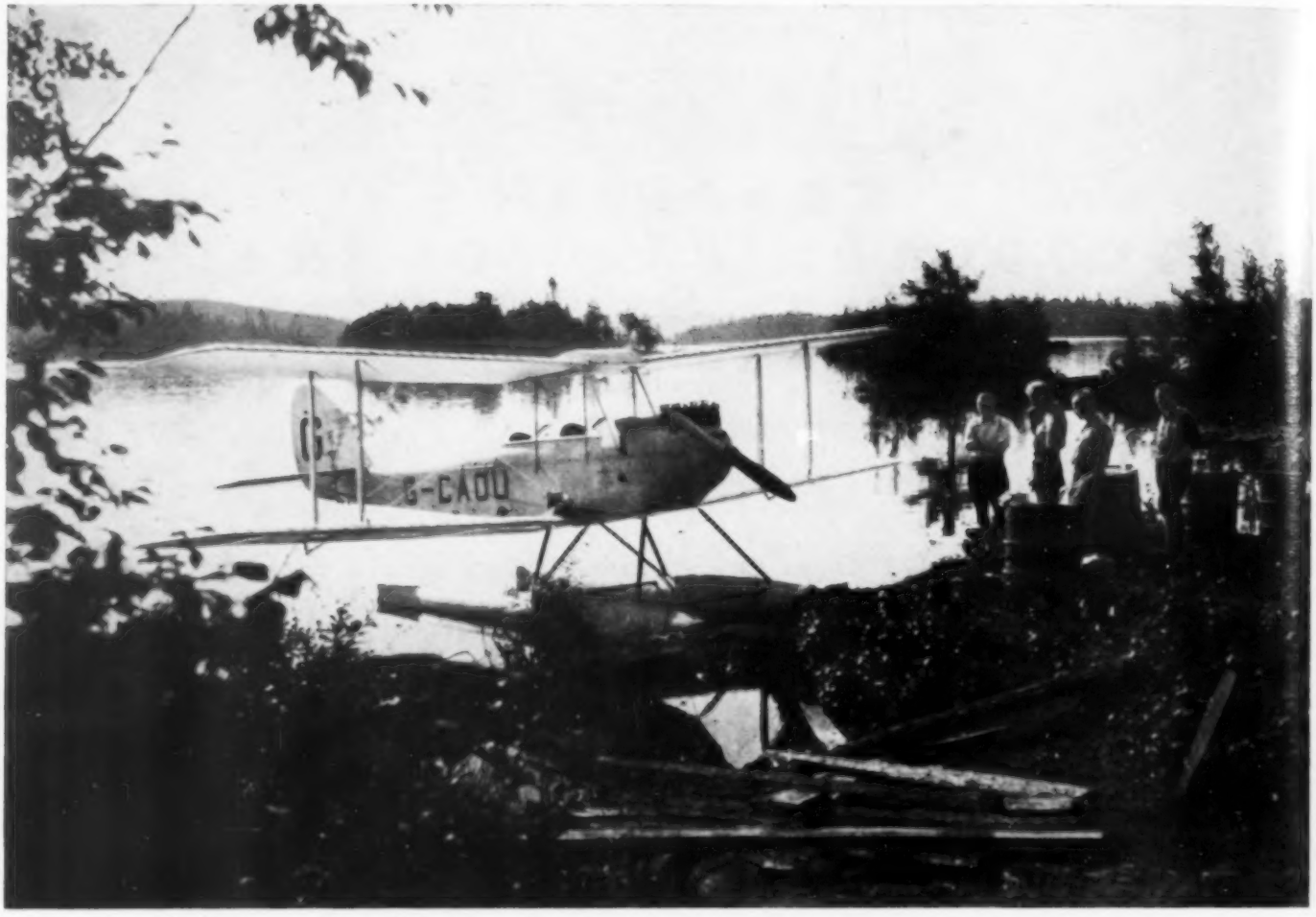


The first reasonably efficient aircraft obtained by the Air Service were HS-2L flying-boats such as the one above. They were first used by the Air Service in 1924.

Wings Over Ontario

by CHARLES W. DILL

Ontario Dept. of Lands and Forests photographs except where otherwise credited.

BATTLES usually are given prominence in the headlines of newspapers. In Ontario, however, there is a battle which, though long under way, has received so little publicity that many residents of the province are unaware that it is being fought. It is waged by airmen against a relentless enemy — the destroyer, fire. Although Ontario's "flying firemen" are seldom seen except by those who live in the north, their activities have a bearing upon the lives of several million people. Were it not for their vigilance, much of the green and beautiful land of the province, where so many now live comfortably and well, would be barren, unsightly, and unfit for habitation.

Duties of the Flying Firemen

Wearing the uniform of the Department of Lands and Forests' Division of Air Service, these men fly in all kinds of weather. They fly over cities, towns, and villages, lumber camps, and homesteads of modern pioneers. The shadows of their wings pass swiftly across forest, lake, muskeg, and sub-Arctic tundra. Their eagle eyes watch over an area of 400,000 square miles, an area containing natural resources of inestimable value.

From spring until "freeze-up" these fliers perform their multiple daily duties. They patrol the skies to spot forest fires; fly men and equipment to fight fires; help foresters conduct

timber management and aerial surveys; and assist in programmes of fish and wildlife management by planting fish in remote lakes and streams, by transferring beaver and other fur-bearing animals to places where such populations are thin, and by detecting violators of fish and game regulations. On occasion they also make mercy flights or rescue flights.

When winter comes and skis replace landing-floats on their aircraft, they help foresters inspect remote logging operations, transport government timber scalers, help fish and wildlife officers make trapline inspections and take wildlife censuses, and carry survey parties with their food and supplies to wilderness bases and back again.

The Introduction of Aircraft

It was not surprising that a place was found for aircraft in Ontario's forestry work. The province has a quarter-million or more lakes on most of which flying-boats can land and take off without advance preparation or expense. There are obvious advantages in observing the province's extensive and often remote forest areas from heights of 3,000 to 5,000 feet, for then the smoke of a forest fire can be seen for miles and the fire located to the acre. Aircraft also provide rapid transportation for men and fire-fighting equipment in country which is otherwise accessible only by canoe.

In Ontario's Forest Service in 1920 there were many World War One veterans, not a few of whom had served with the Royal Naval Air Service or Royal Flying Corps. Here were pilots trained to handle aircraft and mechanics to keep them repaired, if the Service should decide to use aeroplanes. Naturally, the veterans themselves were in favour of the use of aircraft for forest fire detection and were keenly aware of the advantages of doing so.

As their tactical uses had not been fully explored and developed during World War One, the aircraft available after 1918 were not at once considered efficient enough for the purposes of the Forest Service. However, these aircraft had been used during the war to observe the enemy both at sea and on land, and to sketch his positions. In the spring of 1921, with the co-operation of the Civil Operations Branch of the Canada Air Board, tests were made in using them for aerial sketching. One of the observers, who was mapping timber areas from a machine engaged in this work, detected a small fire on the shore of a northern lake, ordered the aeroplane down, and with the pilot's help put out the fire. It was only then that serious consideration was given the use of aircraft in fighting forest fires.

As the results of the experiments in aerial sketching in 1921 were satisfactory, a more extensive programme was undertaken in 1922. The Laurentide Air Service was awarded the flying contract, part of it for a survey, to be made in co-operation with ground parties, of 13,500 square miles adjacent to Hudson Bay. Encouraged by the incident described above and by the R.C.A.F.'s demonstrations of aerial forest fire detection (from a base in the vicinity of Whitney on the southern edge of Algonquin Park), the Province of Ontario that year established an aerial patrol for the purpose with bases at Whitney and Parry Sound. The areas patrolled were the Districts of Parry Sound and Muskoka, and Algonquin Park and adjacent territories. Crews and aircraft of the Canada Air Board were used in the work.

In 1923 a still more comprehensive pro-

Squadron Leader George R. Phillips, World War I flyer and World War II R.C.A.F. instructor and Ferry Command pilot. His 10,500 hours in the air over Ontario should constitute a bush-flying record. He is now pilot and superintendent of Algonquin Park.

gramme was undertaken, providing fire patrols for parts of the Georgian Bay and Algonquin, Sudbury, and Sault Ste. Marie Inspectorates, and using the facilities of the Laurentide Air Service. The aircraft operated from a main base at Ramsay Lake near Sudbury and from a sub-base on Trout Lake near North Bay. A government report of that year reflected a great deal of satisfaction with the work accomplished:

"For detecting forest fires, air observation is not surpassed, especially where settlement is sparse and modes of travel primitive thus prohibiting the placement of an adequate ground detection system of fire towers. In addition, the presence of aircraft has exercised a moral influence on settlers and other users of forest areas covered by the patrols."

In the same year two foresters were engaged in aerial mapping of the Mississagi Forest Reserve, working from a main base at Biscotasing and from sub-bases at Como Lake and Kirkpatrick Lake. That year, also, an aerial survey was made of the Nipigon Forest Reserve. In this case the aircraft were flown from a main base at Orient Bay on Lake Nipigon and from a sub-base on a small island at the mouth of the Ombabika River.

Establishment of the Ontario Provincial Air Service

It was evident now that the usefulness of aircraft in forestry work had been proved. The formation of the Ontario Provincial Air Service under the direction of Captain W. Roy Maxwell followed in 1924. It commenced operation with a staff of pilots and trained mechanics, and fourteen aircraft purchased through the Laurentide Air Service.

HS-2L aircraft at Sault Ste. Marie in 1927 ready for the fire patrol season.

The Service's first air base, also its first headquarters, was at Ramsay Lake on property taken over from the Laurentide Air Service. Other bases were established as quickly as men and building materials could be flown to new locations. Eventually the headquarters base was moved to the more centrally located city of Sault Ste. Marie where, in order to provide adequate facilities for adjusting the war-time aircraft for bush-flying and to maintain, repair, and store them in winter, a fire-proof building was erected to serve as hangar, workshop and warehouse.

When considering the relative worth of the aircraft used in 1924 it must be remembered that the first trial flight of the Wright brothers' famous *Kitty Hawk* had taken place only twenty-one years previously. The first reasonably efficient machines obtained by the O.P.A.S. were HS-2L flying-boats which had been used by the U.S. Navy to detect U-boats during the war. These were bi-planes, commonly known as "pushers" because their propellers were at the rear of the engines, which were water-cooled and set between the wings. The latter, placed above the boat-shaped fuselages, were braced by a network of struts and cross-wires. This arrangement gave rise to another nickname—"squirrel cages." However, when fitted with new motors and generally adjusted by the Service's ingenious mechanics, they proved serviceable in the wilderness.

On 24 and 26 April 1924 the first two of the fourteen O.P.A.S. aircraft to be delivered landed on Toronto Bay. With these machines applicant pilots were tested and given further instruction. However, the Bay did not lend itself very well to practice landings and take-offs because of floating debris. Fortunately the ice soon left Ramsay Lake, so instruction could be carried on there; but the training schedule suffered further delay. The fire patrol season opened 30 April, and both planes were in constant demand. To make matters worse, a serious fire hazard developed that spring. To cope with the situation, each new machine as soon as it was delivered was immediately pressed into service. The last machine arrived from the United States on 3 June.

Sioux Lookout Air Base, 1954. Most flights into the remote Patricia area are made from this base.
D. C. Anderson

The northern part of the province, then, was divided into two patrol districts, *east* and *west*, with Lake Nipigon as the dividing line. Seven aeroplanes were allotted to each. Superintendent of the eastern division, with headquarters at Ramsay Lake, was Major G. A. Thompson. The western division superintendent, Captain J. R. Ross, was stationed at Sioux Lookout. Fire patrol sub-bases were established at Orient Bay (western district) and Amyot near White River, Como Lake near Chapleau, and Bear Island, Lake Timagami. The sub-bases for aerial sketching were at Savanne, Allanwater, Nipigon House, Orient Bay, and Port Arthur. In addition to the sketching, an experimental survey was made, based on aerial photography.

At each base living quarters were selected for pilots and aeronautical engineers, and storehouses, docks, shops and other facilities for maintaining the aircraft, were rapidly installed. Later, to provide greater flexibility, additional sub-bases were established at Remi Lake, Mattagami Post, Biscotasing, Oba Lake, Shebandowan Lake, Fort Frances, and Pine Ridge. Caches of fuel and oil were made at other strategic points. "This wide allocation of men and supplies makes it possible to transfer aircraft from one part of the province to another with little advance preparation" — a 1924 report stated.

Methods of Operation

Among the earliest of the strict flying regulations adopted was one which required that the services of an aircraft must be requisitioned in writing by a district forester, chief ranger, or other authorized person. Thus the machines were not kept flying day after day over areas where the fire hazard was low, but were moved to those in which there was more danger.

Early records show that a pilot could observe approximately 1,000 square miles in an hour; that when a forest fire was detected its location was determined and reported quickly to

the nearest chief ranger; and that the movements of the aircraft were then confined to assisting in putting out the fire as quickly as possible. Usually the reports were dropped in message bags, or were made by landing and telephoning or telegraphing the information. Any aeroplane so equipped naturally transmitted word by radio, but few of them had radio transmitters and few ranger stations had receivers.

Once a fire had been reported the action taken by the pilot depended somewhat on the area in which the fire was burning. If it was in a settled part of the province, the chief ranger dispatched the fire-fighters and their equipment by road or railway or both. But if the fire was not accessible by these means—and this was and still is true of the greater part of the province—the pilot not only reported it but assisted in transporting the fire-fighters and such canoes and other equipment as were required.

The practicability of this procedure was demonstrated in 1925 in the then newly organized Red Lake District. During the summer thousands of prospectors and anglers moved in and out of the district's forests and lake-lands along well established canoe routes, camping and kindling fires to cook food as they travelled. One of these campfires was left burning. The report about the resultant forest fire indicates how quickly, even then, a fire that otherwise might not have been seen in time could be detected and extinguished with the assistance of aircraft:

"A machine of the Red Lake area . . . was transporting equipment from Bear Lake to Longlac. On July 31st, at 7.30 a.m., the pilot detected a fire that merited instant attention. He located Chief Stirret in a canoe on Bluffy Lake, landed, and reported the fire to him at 8.05 a.m. The pilot then flew to Pine Ridge for men and equipment and returned to the fire site with the deputy chief ranger, a crew of men and some fire-fighting equipment, landing at 10.30 a.m. A second flight was made, and more men and equipment were landed at 2.30 p.m.

"On the 11th day, the fire was declared 'dead out' with 3,200 acres damaged. Altogether, the plane made 35 flights totalling 48¼ flying hours and transported 10,135 pounds, including 4,705 pounds of men, and 5,420 pounds of equipment, supplies and food of which 3,700 pounds were flown out again.

"Entirely inaccessible by other means, even by canoe, the fire was handled entirely from the air. Not one of the 27 men engaged in fighting the fire approached it or returned by ground travel."

Map showing principal Ontario watersheds protected by the Department and its Air Service Division.

Other Activities of the O.P.A.S.

From 1925 to 1927, although forest protection work occupied some 60 per cent of the total flying time of the O.P.A.S., other activities such as aerial sketching and mapping, aerial photography, and special transportation were carried out more and more extensively. The advantage over mapping by ground crews lay in the fact that several thousand acres could be seen at one time from the air. As a result, an area that could only have been mapped in several months by a ground crew could be done in a few days. The aircraft were also employed in making rapid aerial reconnaissance surveys to determine damage by fire, or the extent and condition of forested areas.

Thirty years ago many people in the province thought that Ontario's forests extended in unbroken stands to the Arctic Circle and that these forests were inexhaustible. This false impression, created and sustained over a long period of years, was dissipated mainly by the reports of aerial observers.

Gradually, the Air Service was called upon to do more and more flying not directly connected with forestry work. In co-operation with the Dominion Government and with other Provincial Government departments, the Air Service assisted in the delivery of Indian treaty money to the remote Patricia area and other northern wilderness regions adjacent to James and Hudson Bays. Doctors and nurses were flown to remote places in the backwoods and hinterland, even to the sub-Arctic tundras, for the Department of Health to administer to suffering Indians and Eskimos. Often the aircraft carried patient, doctor, and nurse to the nearest hospital, saving valuable time and often a life. Hydro-electric and Highway Department engineers were flown over potential water-power sites and road routes to make rapid surveys. These and the many other outside calls not only demonstrated the wide variety of ways in which aircraft might be used effectively, but strengthened public confidence in a broader use of aircraft in general and in their use by the Ontario Provincial Air Service in particular.

Indian band at the Hudson's Bay post at Big Trout Lake. Forestry aircraft fly Dominion treaty officers to such concentration points. Conservation officers fly in with them to discuss conservation, wildlife management, trapping regulations, and show contemporary films.

Development of Special Aircraft for Forestry Work

Without going too much into detail and history, it is sufficient to say that, from 1903 when the Wright brothers made their first powered flight until World War One, technical improvements in aircraft had depended on the efforts of only a few enterprising private companies doing research with little financial assistance. The demand for efficient aeroplanes for war purposes, however, resulted in government support of the aircraft industry. It then expanded rapidly. Fighter and reconnaissance aircraft capable of travelling up to 120 miles an hour were produced, and also bombers that moved at respectable speeds.

When the first serious attempts were made to ascertain whether it would be practical to use aircraft in forest protection work, it was found that modest loads could be carried and landed on the shores of lakes reasonably close to forest fires, thus saving considerable time between detection of a fire and suppressive action. The remaining problem—the development of aircraft that would carry heavier loads longer distances at greater speeds, and land and take off from smaller bodies of water—occupied the best brains of the Forestry Department, Air Service, and aviation industry for thirty years.

From the old models—the HS-2L, Loening Air Yacht, Liberty Flying-boat, Moth Seaplane, DH-61, Vickers Viking, Vedette, all-metal Hamilton, Fairchild KR-34 and KR-71, Buhl CA-6, and Waco, one or more of which at some time had been part of the O.P.A.S. fleet—improved types such as the speedy Stinson and the Nourdyn Norseman transport were developed, and finally to Department specifications, the D-H Beaver and the Otter.

In 1925, when the fleet consisted of twelve HS-2Ls and ten D-H Moths, both relatively slow and with low carrying capacities (particularly the Moths), the O.P.A.S. logged 2,787 flying hours and carried 1,215 passengers and 276 tons of equipment and supplies. In 1945, with replacements which included four Norsemen and ten Stinsons, 4,808 hours were logged and 10,529 passengers and 1,081 tons of equipment and other material were transported. In 1950, with twelve Norsemen and thirty-three Beaver aircraft, the Air Service logged 11,057 hours (of which 64 hours were for mercy flights and 303 hours for research projects, including flights for entomological and dusting purposes), carried 27,410 passengers, and transported 3,366.5 tons of equipment and supplies.

Since its reorganization in 1942, when the O.P.A.S., formerly part of the Forest Protection Service, became the Division of Air Service of the Department of Lands and Forests, Beaver aircraft have been used almost exclusively. The first Beaver was purchased in April 1948, and in March 1953 the first of three Otter aircraft was added to the fleet. These are similar to the Beaver but are larger and able to carry more. A twin-engine Dove transport equipped with wheels was also acquired. Now the Air Service Division is rated as one of the most efficient of its kind in the world.

Typical mercy flight. Child stricken with polio, flown from Kenora District for hospitalization, arrives at Toronto Island airport in Beaver aircraft.

Distinguished Pilots of Yesterday and Today

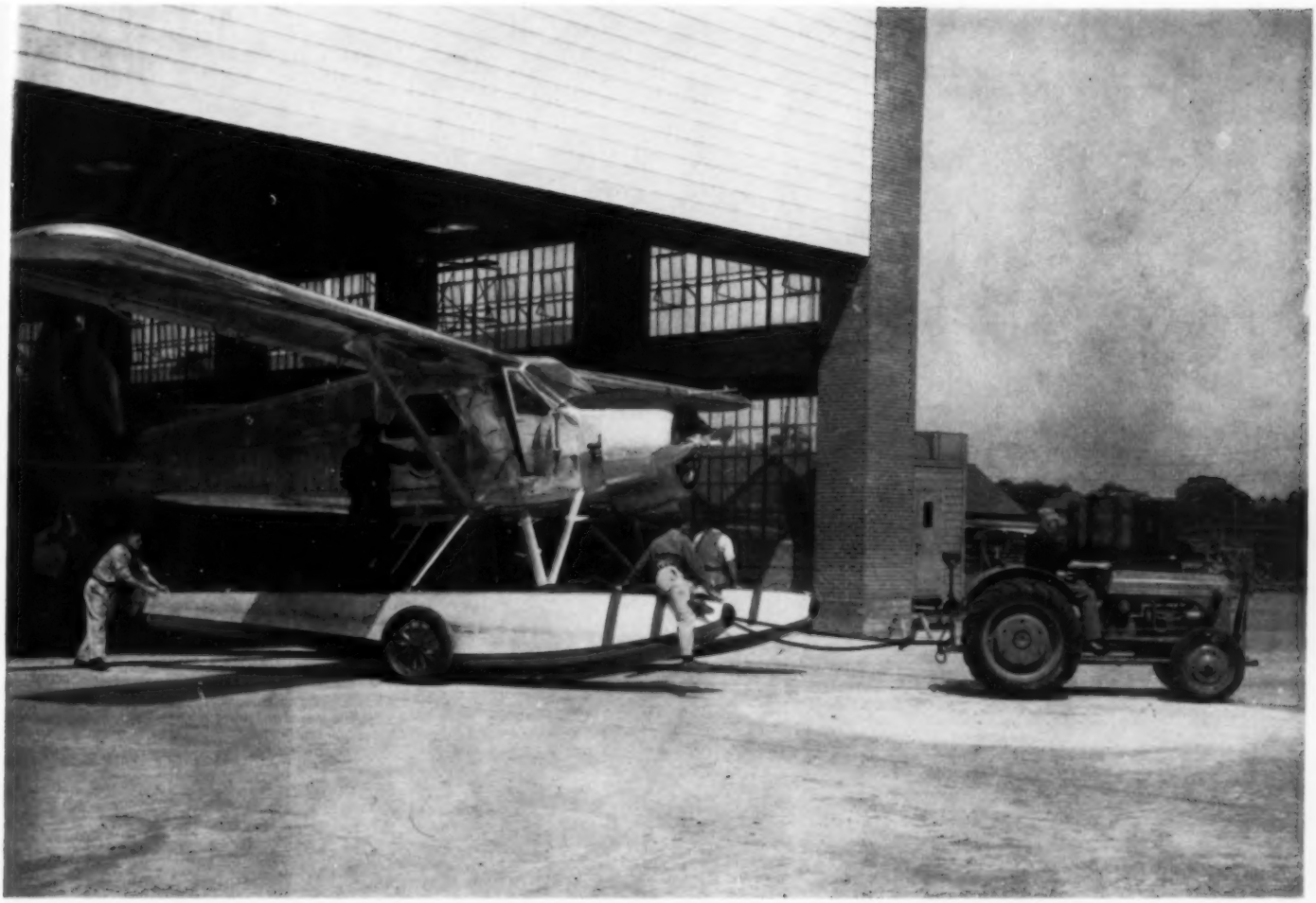
George Ponsford, an experienced pilot, was appointed Director of the O.P.A.S. in 1934 and Chief of the Division of Air Service in 1942. The holder of a commercial pilot's licence, he still likes to spend as much time in the cockpit of an aeroplane as his administrative duties permit.

Many of the pilots prominent in the thirty-one years of the Ontario Provincial Air Service's history have become almost legendary figures in Canadian aviation. These include Ted Stull, now Western Operations Manager of Trans-Canada Air Lines; T. W. Siers, Canadian Pacific Airlines executive; Romeo Vachon, Air Transport Board; Carter Guest, Air Regulations Inspector, Civil Aviation Division, Department of Transport; G. A. Thompson, Civil Aviation Control, Western Canada; the late George Stevenson, after whom Winnipeg's airport was named; George Phillips, one of Canada's most experienced bush pilots, now Superintendent of Algonquin Provincial Park; and the late T. M. "Pat" Reid, manager of the Imperial Oil Company's Aviation Division.

Four of this elect bush-flying fraternity—Phillips, Vachon, Reid, and Siers—received the McKee Trophy, an award made annually for the most notable contribution to the advancement of Canadian aviation. Also known in international aviation circles both in war and peace were "Duke" Schiller, Lee Brintnell, Jack Caldwell, Dick Bibby, Jack Judd, Hugh Gibbs, George Trussler, Tommy Woodside, Fred Stevenson, Eric Billington, and Jimmy Medcalf and Terry Tully. Medcalf and Tully went down in the Atlantic Ocean during one of the early attempts to fly across it from London, Ontario to London, England. They were never found.

Modern Forestry Aircraft, Their Equipment, and Its Uses

The early pilots of the O.P.A.S. would certainly appreciate the improvements that have been made in aircraft since their time. If they



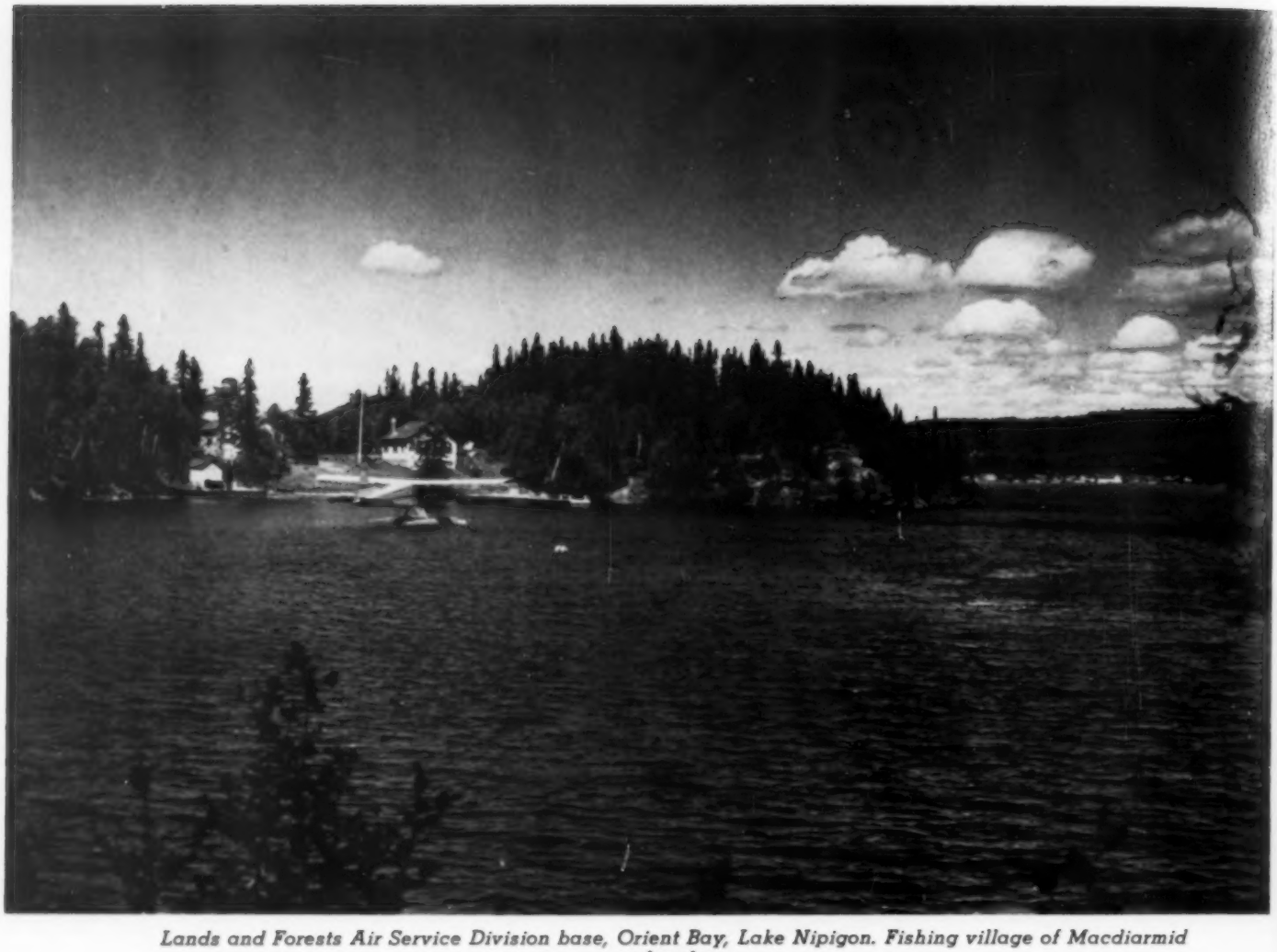
A small tractor moves a Beaver aircraft from the big hangar to the slipway ramp, Sault Ste. Marie.

could fly with the Air Service today, they would admire the short, quick take-off of the modern aircraft, their carrying capacity, speed and performance. They would realize, however, that although the history of the Air Service is rooted in the early beginnings of Canadian aviation as a whole, its development was nurtured by its own pioneer pilots. They would also be aware that it was further encouraged by the continuous willingness of the Service to explore new ways of increasing efficiency.

Without doubt the pioneer pilots would welcome also the new instruments and equipment in the modern aircraft—the long range two-way radio; the polaroid cameras; the ground-hailer, a unique device which will be described in detail later in this article; the apparatus for dropping water-bombs to put out incipient fires; the parachutes that drop pumps, hoses, and other fire-fighting equipment and supplies, without damage, to fire-line crews; the aerial estimator that helps determine the size of a fire, a lake, or any topographical feature; the aerial fish-planting unit; the new aerial camera used in forest inventory work; and the new winter landing-skis.

The recently developed water-bombing technique is still classed as "an experimental method of quenching or at least holding small conflagrations." The bombs are leak-proof paper or plastic bags holding about five gallons of water and weighing about thirty pounds when filled. Twelve of these can be carried on the set of framed metal rollers on the floor of the aircraft's cabin and, simply by pushing, can be dropped through the camera-hatch singly or in salvos of as many as six at a time. With a minimum of experience great accuracy of aim can be attained.

Previous attempts to sprinkle fires from aircraft entailed the use of one or more compartments of the machines' floats, which were filled by means of a valve that could be opened on take-off. The water was then sprayed out in



Lands and Forests Air Service Division base, Orient Bay, Lake Nipigon. Fishing village of Macdiarmid on far shore.

flight at low altitudes. This system was not very successful; but the Department, always willing to test a new theory, did not reject it until it had been tried.

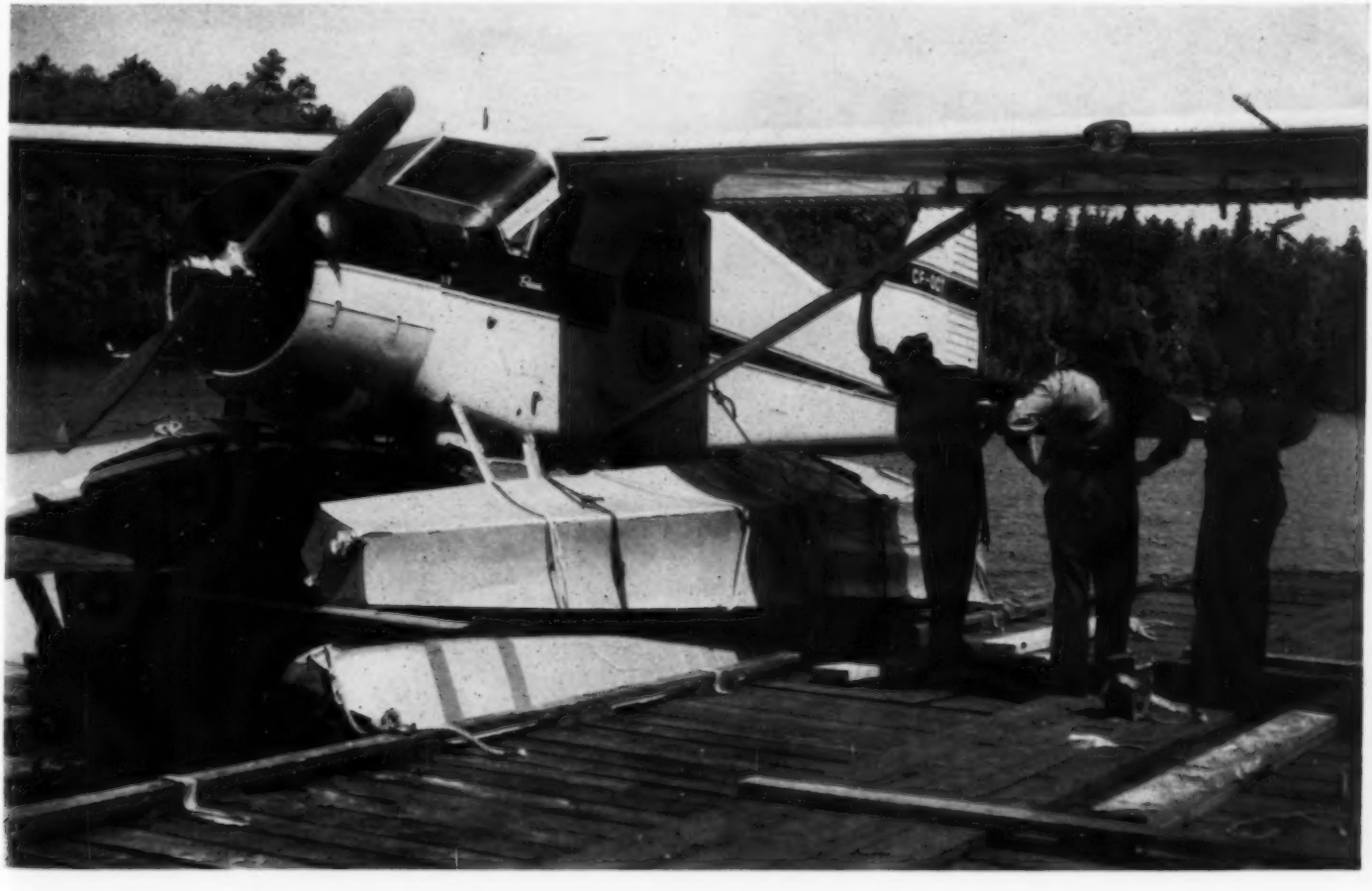
Winter flying poses unusual landing problems. The hazards include fresh snow, slush, ice hummocks on frozen lakes, and bare spots on airport landing-fields. Not wholly satisfied with the available commercial landing-skis used in winter, the Air Service specialists at Sault Ste. Marie built a type of their own design, believed safer than the others.

The efficient distribution of hatchery-raised fish to planting sites has always been of prime importance in the programme of fish management; for the proper quantity of fish must reach these places at the right time of year. Delivery by truck has often been delayed by road conditions; moreover, in rough country the distribution of live fish from trucks to perhaps twenty or thirty lakes which may be from 100 yards to 5 miles from the nearest road has always been extremely difficult. Eventually the assistance of the Air Service Division was sought. As soon as the ice left the northern lakes an aeroplane, which of course did not have to wait for the roads to dry, transported ten cans, each containing 300 speckled trout yearlings, and planted the fish while water temperatures were correct and food supplies on the increase. Hatchery personnel were able to supervise the total distribution; better planting sites were reached than by road; and because of the speed with which the operation was conducted expenditures for food and ice were substantially reduced and a larger number of fish survived.

Special apparatus for transporting and dropping fish, evolved by experts of the Fish and Wildlife Department, Air Service, and Re-

Right: Canoe strapped to float rigging. Note that carrying capacity of Beaver aircraft includes extra float which will replace damaged float of airplane on distant lake.

When new areas open up fire patrols must be intensified and land use checked. Manitouwadge, 1955

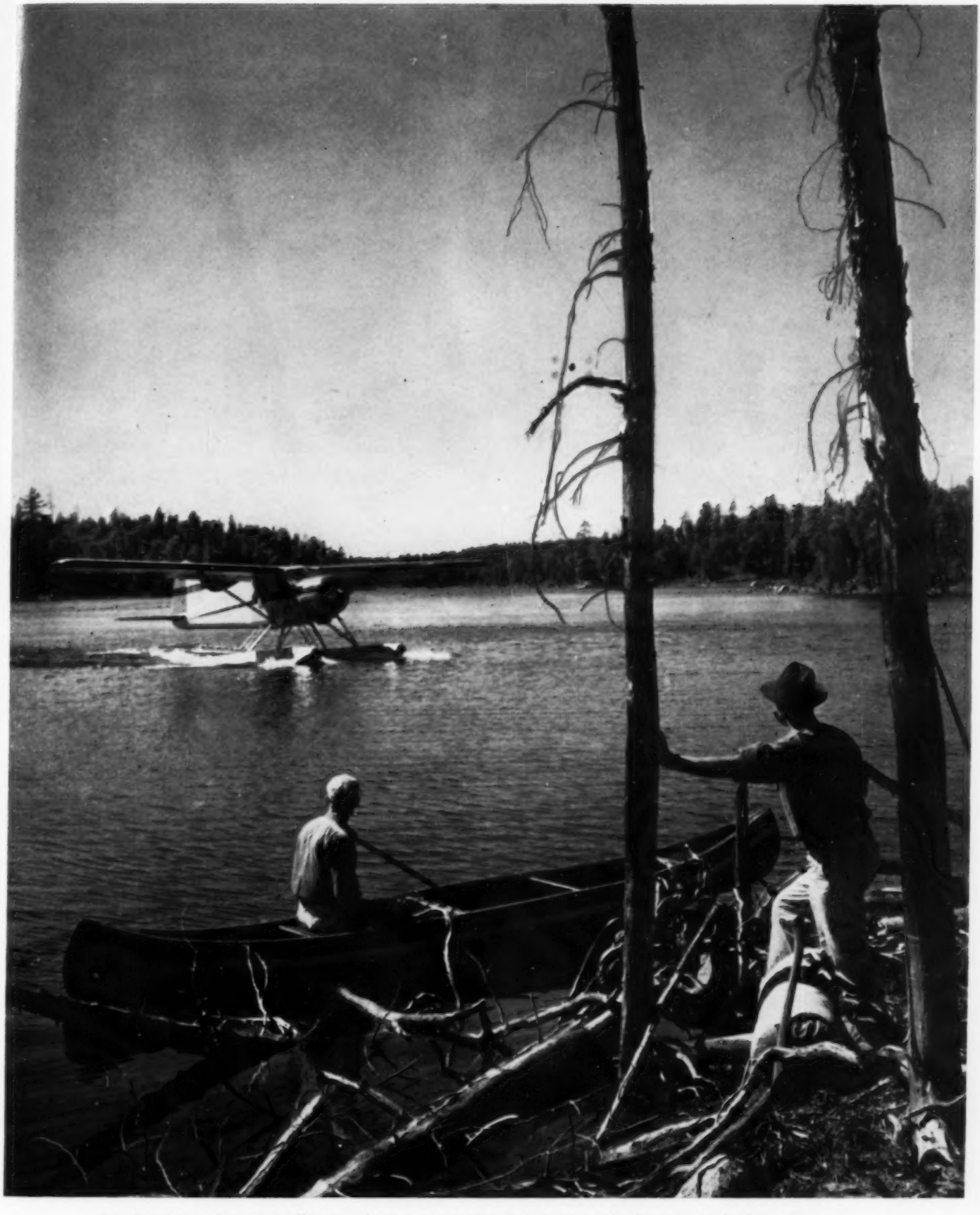


Filling water bombs at a fire-line base camp.

Water bombs may be dropped singly but are usually released in salvos of six or eight, to dampen and hold incipient fires pending arrival of fire crews.

Beaver aircraft equipped with the new experimental skis for winter flying.

Another type of ski used on the aircraft of the Air Service. Landings in the rough north country are hazardous in winter unless the skis used are as efficient as possible. Air Service personnel at Sault Ste. Marie have designed special skis for forestry aircraft.



Rendezvous with rangers. The men have just completed inspection of a fire tower telephone line.

Air view of camp of Ontario's experimental chum salmon stocking expedition, junction of Mishimattawa and Moose Rivers, latitude 51° N, January 1955.

Below:
Fish management officers cut holes in three feet of ice to prepare "beds" on river bottom and plant chum salmon eggs to establish fishing industry for northland Indians and encourage their self-support.

search Division, is now in use. The fish are carried in trays in two water-filled tanks equipped with anti-splash boards and placed lengthwise in the aircraft. Approximately 8,000 fish can be moved when a full complement of ten trays is carried. Oxygen is supplied to the tanks automatically by means of a therapy unit. The fish are discharged through the camera-hatch at low altitudes by means of a funnel which is twenty-seven inches long, fifteen and one-half inches wide at the top and four inches wide at the bottom, and curves toward the tail of the aircraft to release the fish into the slip-stream. A simple plunger arrangement regulates the release of the required number of fish. They are kept constantly in water containing adequate oxygen except for the short time when they are falling through the air at a speed estimated to be about fifteen miles an hour.

Many of these operations have been closely observed and their results carefully examined. Of the fish that enter the water, scattered over an area 50 feet wide and 200 feet long, none have been found dead or injured. They have been seen swimming about for a moment or two near the surface as if to get their bearings before disappearing into the depths.

The Otter aircraft used to transport the chum salmon eggs, food, supplies, equipment and men from Port Arthur. Six months later, in June, the party was flown north to the Attawapiskat River to plant chum salmon fingerlings raised at the Port Arthur Hatchery.

Pilots can now "talk down" to settlers and others dwelling or travelling in remote areas, by means of the "ground-hailer".

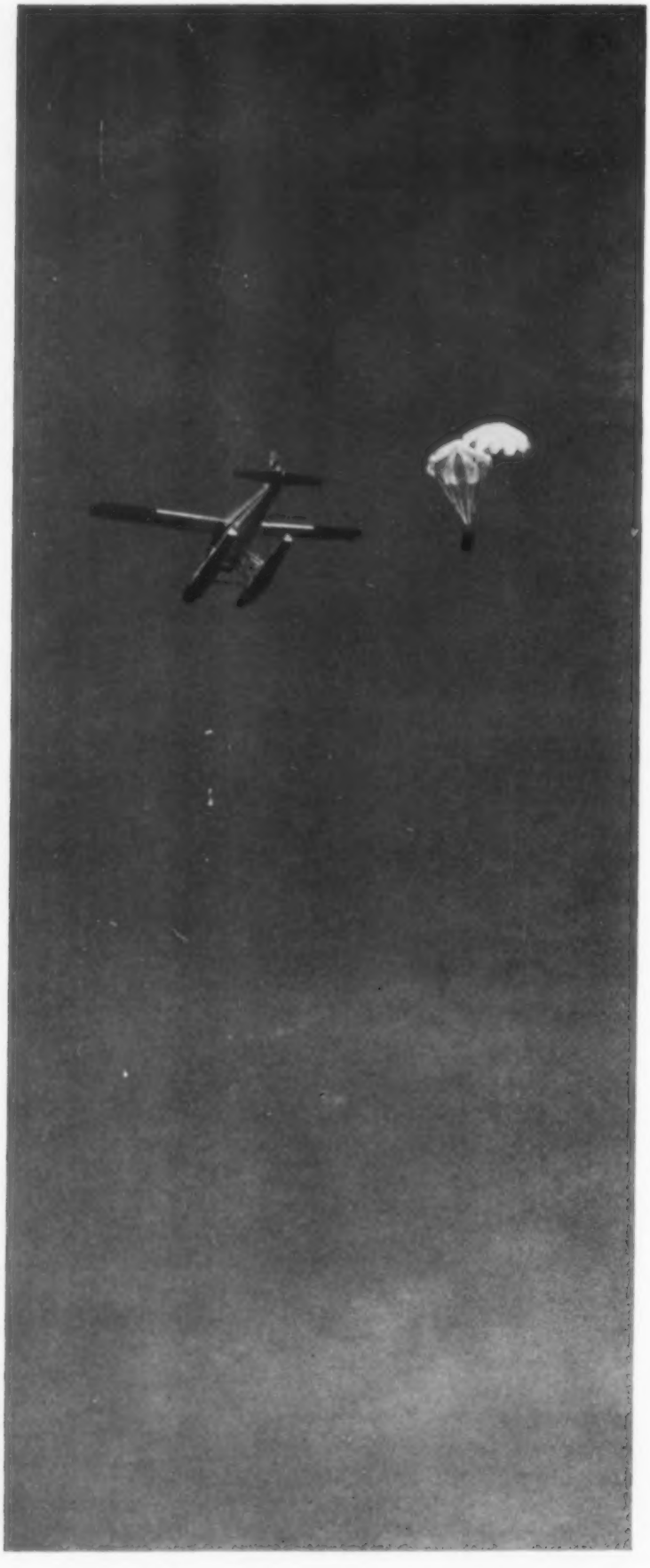
Below:
Indian band in summer quarters at Lansdowne House, on Lake Attawapiskat, 175 air miles north of Longlac. The entire band turns out to meet fish and wildlife management officers come to discuss fishing and trapping conditions.

Until recently, unless a person on the ground had a portable radio which was turned on and tuned to the radio wave-length of the Department's aircraft, the pilot could not communicate with that person from the air. A novel addition to the communication system, however, has made it possible to do so. This unit, officially known as a ground-hailer, is also referred to as the "voice from the sky" because of an incident that occurred soon after its introduction.

A settler, on the point of leaving a large brush pile burning and going home for the night, was observed by an Air Service pilot. Using the ground-hailer the pilot issued a warning to "put that fire out before you leave it!" To make sure that his instructions were carried out, he radioed a nearby ranger station. A ranger hurried to the scene but found neither flames nor smoke. At the nearest house he asked if the owner had been burning brush. The settler replied, "Ho-yes! I was burning that brush. But a 'voice from the sky' tell me to put that fire out. So I did it, and then I come home!"

The ground-hailer is simply a loud-speaker, powered by an amplifier and equipped with a

In heated tent set over hole in ice 436,000 eggs were successfully transferred from shipping crates to prepare "bed" on gravelly river bottom.



microphone, which can be set into the camera-hatch and which permits the pilot to address persons on the ground. With it he can give directions to fire-fighters, direct lost persons, and warn travellers or cabin-dwellers endangered by fire. It has already saved lives and prevented forest fires.

New Techniques for Fighting Forest Fires

One of the treacherous characteristics of forest fires is their tendency to jump. Once they take hold, particularly in coniferous forests, temperatures up to 2,700 degrees Fahrenheit may prevail. Whether winds blow or not, the intense heat causes powerful updrafts which hurl blazing twigs and bits of bark as far as five miles from the main fire. In this manner a few years ago a fire that burnt a large area between Red Rock and Nipigon jumped across Nipigon Bay, a distance of more than three miles.

In terrain where roads have not yet become necessary, ground crews may be unable to cope with jump fires by using orthodox techniques. A combined operation, therefore, has been worked out in which the Department's aircraft fly back and forth over the rough country and dense bush areas to the nearest lake on which landings can be made and there set down men, canoes, and equipment as close as possible to the jump fires or main fire-lines. The aircraft also drop water-bombs to hold the fires. These techniques have saved many hours and spared men the exhausting labour of carrying heavy loads of equipment long distances.

Where access by road is possible, regular fire-fighting techniques, of course, are employed. Ground crews are rushed to the fires by

The portable gas-engined fire pump contained in a cushioned canister on its way down to the fire crew below. Note that two parachutes are used to reduce the rate of fall.

This huge mass of fire fighting equipment, tents, bedding and other supplies was flown to and returned from a single fire, by aircraft. Mobert Chief Ranger Station, White River.

An Otter transport plane is being loaded with food for fire-fighters. White River.

truck and at once commence establishing fire-lines, working with pack pumps, axes, grub-hoes, saws and Pulaski tools or, where possible with bull-dozers, fire-line ploughs, or tank-pumpers. Portable fire-pumps are set up wherever water is available, hose is run out, and the fire-lines are soaked down; then the fire itself is attacked. Once it is under control, the arduous task of smudging begins. Often in muskeg or rocky country it takes weeks to complete this. Muskeg fires often burn for years, winter and summer; but they are always put out if it is possible or necessary. In rocky country the entire fire area must be carefully examined by the smudging crew, even to the cracks in the rocks, in case dead roots or hidden debris may be smouldering. But whether a crew is engaged in this work for a day or for weeks, the men must receive food and other supplies, and in remote areas these are delivered by air.

A very useful vehicle for transporting fire-fighting equipment short distances in rough country is a pack-tractor which can be taken apart, put in an aircraft's cabin, and quickly reassembled on reaching its destination. Developed jointly by the Research, Air Service and Forest Protection Divisions, this small but highly efficient wheel-track vehicle will carry a 700-pound load up a steep hill at walking speed. When it is used, men arrive at the bush fire in condition to commence fighting it immediately.

The D-H Beaver and the larger Otter are accepted now as standard equipment for forestry flying. Designed in close co-operation with the Department's Air Service Division, they not only have met the Department's transport requirements, but because of the peculiar lifting of their take-off have been used on 25 per cent more lakes than their predecessors. Painted yellow and black and bearing the distinctive Air Service crest, the aircraft are known to the Indians of the north as *Ahmic spas-ni-chiggin**. Their presence is a comfort to remote forest dwellers, bush workers, woods travellers, and people on vacation, who know that sharp-eyed pilots on daily patrols have them in sight and will come to their aid in emergencies.

However pleased they may be with their present aircraft and its versatile supplementary equipment for fire-fighting, fish-planting, aerial survey, and other purposes, Ontario's Air Service fliers are constantly suggesting improvements which might be made. They know that in fire they are matched against a relentless enemy and that to win victories they must always be in a position to act quickly and effectively.

Pack-tractor wheeled into position for disassembly and loading into Beaver aircraft.

Organization and Communication System

When fourteen years ago it was decided that the Air Service had proved its worth and was ready for expansion, one of the first tasks was to enlarge the headquarters base at Sault Ste. Marie and to make it as nearly self-sufficient as possible. The original hangar, which was 80 feet by 180 feet, had been outgrown and outmoded in fifteen years. The new structure was designed for fifty years of usefulness and its equipment was strictly standardized. It is 360 feet long and 180 feet wide. It contains the Air Service's administrative offices; all the equipment necessary for air frame, engine, and instrument maintenance and repair; and enough space to store fifty aircraft in winter.

In former years the Department utilized aeroplanes designed for purposes other than its

* *Ahmic spas-ni-chiggin*. *Ahmic* means beaver in the Cree and Ojibway languages. The rest of the phrase refers to the sounds made by the aircraft when landing and taking off.

Beaver aircraft lined up for morning inspection at British Empire Forestry Conference demonstration, Lake Opeongo, Algonquin Provincial Park.

Otter aircraft. Three are owned by Lands and Forests Air Service — the first was purchased in March 1953 — two are used for heavy transport work and one for aerial photography.

Air view of huge Lands and Forests headquarters air base hangar, workshops, warehouse, and administrative building, Sault Ste. Marie. The hangar, originally 80' x 180', now 180' x 360', will accommodate entire fleet of 40 aircraft for winter storage with room for ten more, and contains every mechanical and other facility to rebuild planes if necessary.

own and adapted them as much as possible to its requirements. Only by following its programme of standardization was the Department able to guarantee the manufacturer adequate initial absorption of output and this, in turn, made it possible for Beaver aircraft to be designed and developed specially for bush-flying. The Department's specifications were that the aircraft must be able to carry the greatest possible load in relation to its speed of flight, range, and quick landing and take-off potentials. It is notable that because of the stability of this aeroplane, the efficiency of the workshop, and the strict observance of flying regulations, the accident ratio of the Department's Air Service Division is extraordinarily low.

Group of technical and other employees with long service records, Sault Ste. Marie headquarters air base. Left to right, front row: L. R. Failes, 30 years; W. Murray, 19 years; D. N. Kraushaar, 28 years; G. E. Miles, 26 years; A. L. Harvey, 30 years. Standing: R. H. Fraser, 23 years; A. E. Denning, 30 years; H. J. Phillips and D. H. Murray, 31 years; G. A. Doan, 26 years; G. A. Gill, 30 years; S. Macauley, 31 years.

The vastness of the area over which the aircraft of the Division of Air Service fly cannot be imagined by anyone who has not travelled the length and breadth of the province. For forest protection purposes alone, the Air Service patrols a 250,000-square-mile area. Add to this the vast hinterland of the Patricia area to the north, and the total is 400,000 square miles. (The Patricia area is not regularly patrolled for fire but, because it contains a great wealth of fish, fur-bearing animals, and other wildlife, is supervised by Fish and Wildlife Department officers, who must be flown into the area to make trapline and commercial fisheries inspections and to take censuses of game.)

To patrol and serve so large an area efficiently, a sizable organization is needed; because of the distances involved, it is subdivided. Ontario now contains twenty-eight sub-bases from which aircraft are operated during the fire season; eleven of these are manned the year round. The present fleet consists of forty Beaver aircraft, three Otters, and a twin-engine Dove transport. Most of these are in

As each year's fire season progresses reserves of oil and high octane fuel must be stock-piled. This barge load was towed from Macdiarmid to Orient Bay air base, Lake Nipigon.

constant operation, especially during the summer.

Necessary to continuous, safe operation is the extensive radio network which constitutes the nervous system of the Forest Protection and Air Service Divisions of the Department of Lands and Forests. It consists of twenty medium-power district stations and ninety-three main ranger stations strategically located across the province. All of these may communicate directly with each other, or with the powerful central station at Maple, Ontario. This central station is in direct contact with the Forest Protection Chief at the Parliament Buildings in Toronto, by telephone and teletype. There are 328 fire detection tower transmitter-receivers; and 151 light and 11 medium portable two-way radios are available for use on the fire-lines. Twenty-eight two-way radios have also been installed in Department vehicles, nine in lake patrol-boats. Thus, all of the Air Service's pilots can establish communication with a radio system that covers any or all fire zones in the entire 110,000,000-acre forest area under the administration and protection of the Department, as well as with certain strategic offices in Southern Ontario.

In the cabinet shop, Jack Smith works on one of staff-designed laminated skis for Beaver aircraft.

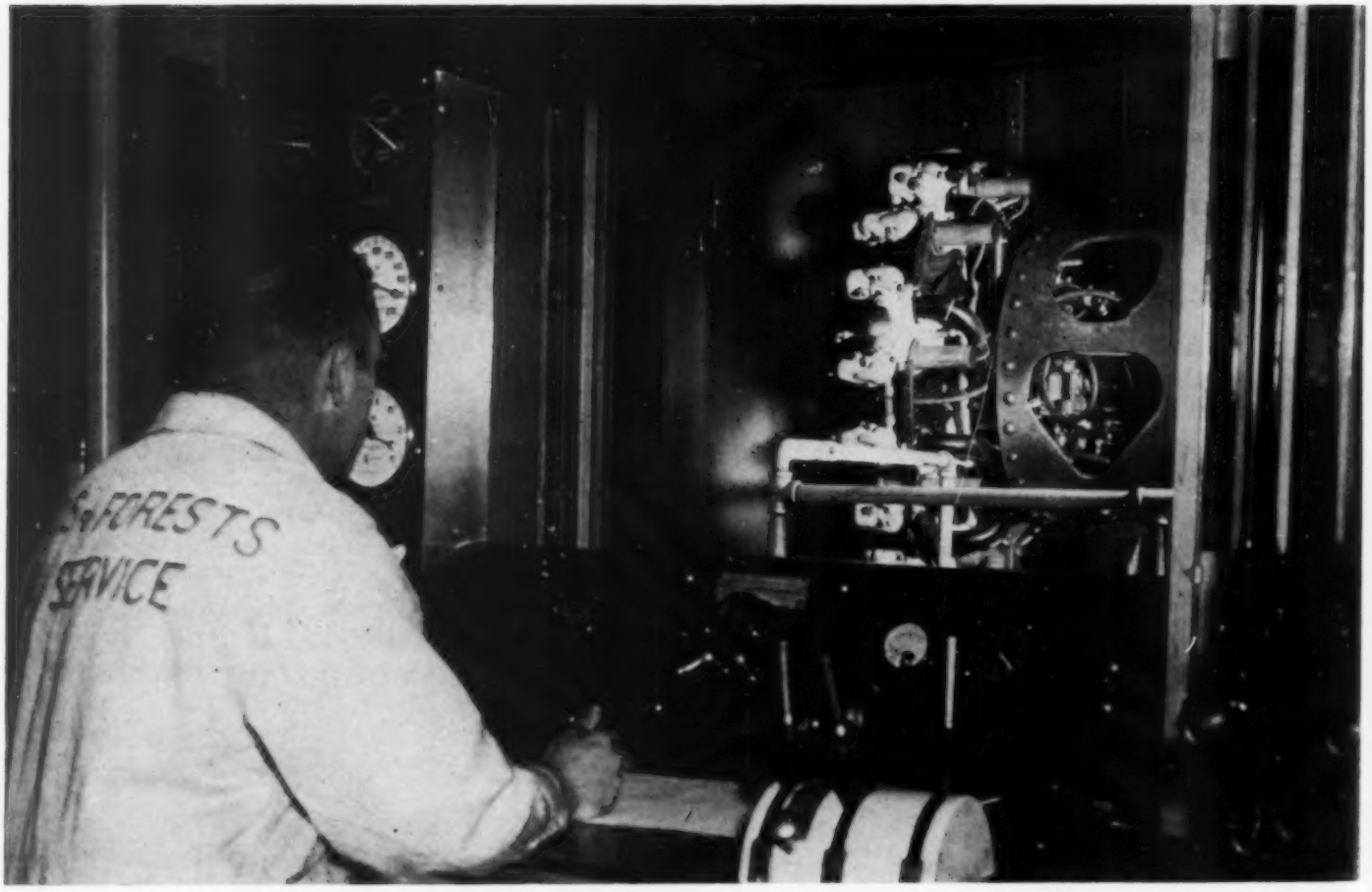
The Air Service Division and Conservation of Natural Resources

It is known that the demand for hydro-electric power in Ontario is increasing rapidly.

Beaver aircraft on winter timber inspection at McGowan Lake, Shepherd Township.

Sam Macauley check-lists overhauled Beaver aircraft motors.

A. J. Elliott tests block of Beaver aircraft motor at Sault Ste. Marie base. Instruments indicate degree of performance perfection.



It is also known that hydro-electric power cannot be developed successfully without a plentiful, constant, and uniform flow of water. Such a supply of water is not assured unless it is conserved at its source. Forests, through their root systems, absorb the moisture deposited in the earth by rain or melting snow, and release it slowly. Thus forests tend to prevent floods and wasteful run-offs of water, with their resultant erosion of valuable top-soil and silting up of power-producing dams and fish-spawning areas. The conservation of water at its source is one of the prime concerns of the Division of Air Service.

In addition, the Department's Division of Air Service makes itself generally useful to all other government departments; works closely with the Ontario Provincial Police, providing rapid transportation for the purposes of investigating bush accidents or crimes, and searching for lost persons; co-operates with the Department of Health and often flies physically and mentally sick persons, sometimes from as far north as Hudson Bay, to hospitals; and frequently assists the Departments of Mines, Public Works, and Highways, and the Hydro-Electric Power Commission of Ontario.

Another of its concerns is the conservation of forest and lake-land areas so that their natural beauty may bring enjoyment and relaxation to Ontario's citizens and guests. These physical assets attract 70 per cent of Canada's tourist trade and millions of dollars annually to Ontario. For this reason alone, adequate forest protection, supplemented by air patrols and air transport, is of paramount importance.

Northern Ontario, where our greatest remaining forest, water-power, and wildlife resources and recreational potentials exist, is approximately 75 per cent land and 25 per cent water. Since nature has provided countless landing areas for float-equipped aircraft, we would be most unappreciative, even negligent, if we did not utilize them to facilitate protection and management of the province's forests and lake-lands, and thus help perpetuate them for the use and enjoyment of generations unborn.

Beaver aircraft in hangar at Smoke Lake Air Base, Algonquin Provincial Park.

Trees surrounding Estancia Killik Aike Norte *contrast sharply with the bare hills where* mata verde *and bunchgrass grow.*

Sheep Ranchers of Patagonia

Story and Photographs by RICHARD HARRINGTON

THE pampa of northern Argentina, green alternating with black ploughed land like the Canadian prairies, ended at Bahia Blanca, where the plane touched down. A little south, the Rio Colorado formed the northern boundary of Patagonia, a wavering line about the 39th southern degree of latitude. There a narrow strip of desert separates the cattle, crops and cities of Argentina's fertile pampa from the bleak Patagonian "camp".

Now the narrowing strip of country, wedged between the towering Andes and the South Atlantic Ocean, was sandy brown, unrelieved by any green. Lonely narrow trails curved out of the horizon and straggled off into a vast nowhere, seeming to link nothing. The airstrips looked tiny on the enormous plain, where the wind whipped noisily through the wires, and battered small shrubs into early death. "Ah, señor, it's a god-forsaken land," said the Argentinian pilot in English.

About halfway down the length of Patagonia, the region became even more harsh and desolate, the land constantly eroded by wind. On the coast at Comodoro Rivadavia, oil wells stood out in the shallow water, and a refinery gleamed

C.G.J. map

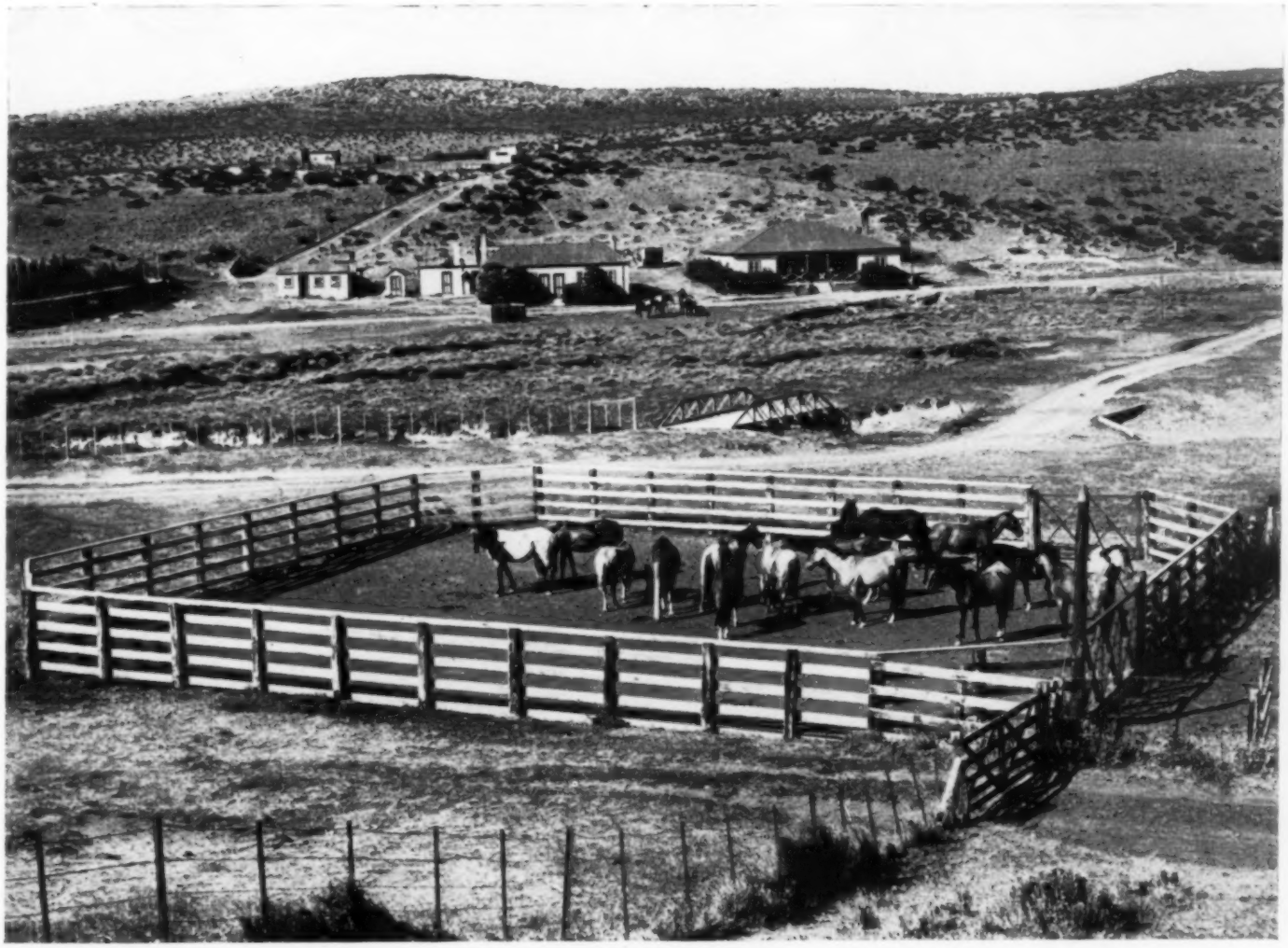
The hacienda at Killik Aike Norte is protected by tall trees, and graced by flowers and shrubs.

on shore. Busy little bugs of cars scuttled around, raising clouds of dust.

Turning inland, our plane flew southwest, where the wind howled straight across the white peaks of the Andes. Green lakes showed amongst carved barren foothills, among them Lago Argentina. Another leg of the journey brought the plane to Rio Gallegos, the last town of the Patagonian mainland. Tierra del Fuego lay farther south, across the stormy Strait of Magellan.

Rio Gallegos is about as far south of the Equator as the lower part of James Bay is north of it. It might be considered in the sub-Antarctic, which is enough like Canada's sub-Arctic in its raw chilly weather and its daylight that lasts nearly to midnight in summer. The town has a population of 14,000, comprising workers in a small coal mine, supply base for weather stations in the Antarctic, political prisoners, but mostly those having something to do with the sheep-ranching industry. One or two streets are wide and paved, and a few substantial buildings line the main street. Beyond come colonies of small houses, sheeted in galvanized iron, a favourite building material in this treeless region. Farther along, located by the river with its forty-foot tides, is the refrigeration and meat-packing plant, which has changed the economy of southern Patagonia.

Cookhouse, bunkhouse, corrals and kennels are grouped in the vicinity of the hacienda at Killik Aike Norte.



A shepherd, in wide pants tucked into high boots, sits warm on his saddle of two rolls of straw covered by a sheepskin.

Although wool is by far the most important business, the marketing of lambs and old ewes became important after this export freezing plant was established. It provides an outlet for thousands of head annually, which previously had no value other than their sheepskins. Because of their hardiness and higher meat yields, Corriedale and Romney Marsh have replaced Merino as the dominant breeds.

A central gathering-place for sheep ranchers in this region is the British Club of Rio Gallegos, with some 150 members. Around the small tables gather ranchers of pure British type, sturdy, ruddy-cheeked from the constant wind. They or their fathers emigrated from the Falkland Islands. They speak English amongst themselves and in their homes, but Spanish to their employees, often with a pronounced Scottish or English accent.

The manager puts the sheepdogs through their paces at Killik Aike Norte. These are well-trained intelligent beasts.

Señor Carlos Felton, of Killik Aike Norte, was characteristic of the group. His estancia was a "medium-sized" ranch of 75,000 acres, about thirty miles out of town on the north bank of the Gallegos River. His father had been one of the pioneers, bringing 800 sheep with him from the Falkland Islands in 1886 by sailing ship. Felton, Sr., lived in a tent on dry beans and guanaco meat while building up his fortune with tenacity and vision.

His son is the outstanding sheep-rancher in the area, and president of the Corriedale Breeders Association of Argentina. He is one of the few—and all of them British—to go in for herd improvement and a breeding program. On several occasions, Mr. Felton has had stud rams flown from New Zealand, and his animals have brought record prices at International Fairs in Chile and Buenos Aires.

The homes of these ranchers contrast sharply with the bleak landscape. The incessant wind sweeps over the treeless rolling country which

The shepherd of Patagonia rarely travels without his boleadoras. *Thrown in this manner, the rubber balls wrap the thong around the legs of any creature the shepherd pursues, without breakage.*

is matted with low shrubs, mostly mata verde. Then, remarkably, a well-planted grove appears, sheltering some ranch house from the blustering wind. Oaks brought over from England in sailing vessels temper the wind on the elderberries, which in turn protect the columbines, roses and pansies.

Their homemaking, too, is of the English type with comfort and modern improvements, books and music. This was true, not only of the Feltons' estancia, but of others as well. Although Patagonia is literally "at the end of the world", these ranch folk are well abreast of today's interests, through the books, newspapers and magazines of three continents.

One of the shepherd's duties is to check on water-supply, provided by windmills in this dry windy country.

Although distance separates the ranchers, there is considerable social life, for most are inter-related in some way. Extremely hospitable, the ranchers and their wives make guests genuinely welcome, without fuss or hectic entertainment. Guests may fish for salmon trout in the streams, shoot the upland geese with the rancher's thanks, or ride the ponies to the penguin islands on the coast, as they will.

The shepherd brews himself a drink of mate yerbe *in the traditional gourd container, sucking it through a silver* bombilla.

A special treat is *asado al palo*, lamb carcasses roasted on spits over an open fire. Mutton forms the staple diet for patron, peon and sheepdog.

The estancias are run on a feudal system which could not exist in Canada. The patron lives in a well-equipped hacienda, is usually absent during the unpleasant four-month winter season, gets the choicest cuts, and is addressed with great respect. The peons are usually illiterate, given to pilfering, protected by government regulations, and are by no means enslaved. They can and do quit at moment's notice. On the other hand, servants often remain with a ranch until the end of their days. No one seems unhappy about the gulf between the two classes.

Most shepherds, *ovejeros*, are Chileans, and receive the government-established wage of 430 pesos ($23) a month, plus food and lodging.

The latter may mean sharing bachelor quarters with others, or if married, a small house with his family. A peon, or general labourer, gets $20 a month. At year's end, all receive the *aguinaldo*, a bonus of one month's wages.

Estancia Killik Aike Norte employs twenty-seven men all year, including the general manager, a cook, and five or six shepherds. The flock of 25,500 sheep (7,000 of them lambs) is considered on the small side in this region.

The shepherd's life in Patagonia parallels that of the sheepherder in Alberta to a large extent, except that seasons are reversed. Very large ranches maintain clusters of buildings at the hub of different "sectors", where the shepherds, peons, foreman, and cook handle operations. On smaller estancias, the bunkhouse, corrals, kennels, shearing-shed and cookhouse are grouped near the hacienda. In either case, the shepherd's life is about the same. He rises, not too early, eats breakfast at the cookhouse, selects two of his half-dozen sheepdogs, mounts his horse. These shepherds are rarely out of the saddle.

Each shepherd has his own sector to patrol, covering many square miles. During the day, the shepherd "cuts camp" (rides the range) tightening fences, putting out salt licks, checking on births, deaths, and the water supply on one-half of his sector. Next day he thoroughly inspects the other half.

Sheep sometimes fall on their backs, too unwieldy from the weight and size of their fleece to regain their feet. A sheep would starve to death in five or six days. So the shepherd must always be on the watch for a fallen sheep, and ease it back onto its feet.

The principal range vegetation is a hard bunchgrass, not too palatable in summer when there are seasonal soft grasses, but invaluable in winter. Although barren country, southern Patagonia supports one sheep per four acres, compared with the 10-acre average in south-eastern Alberta. Since precipitation is about six inches a year, sheep-ranching would be impossible here without windmills; the constant winds serve a useful purpose in bringing water up 300 feet to the surface. Estancia Killik Aike Norte has fifty such windmills, since the tidewater in the river cannot be used.

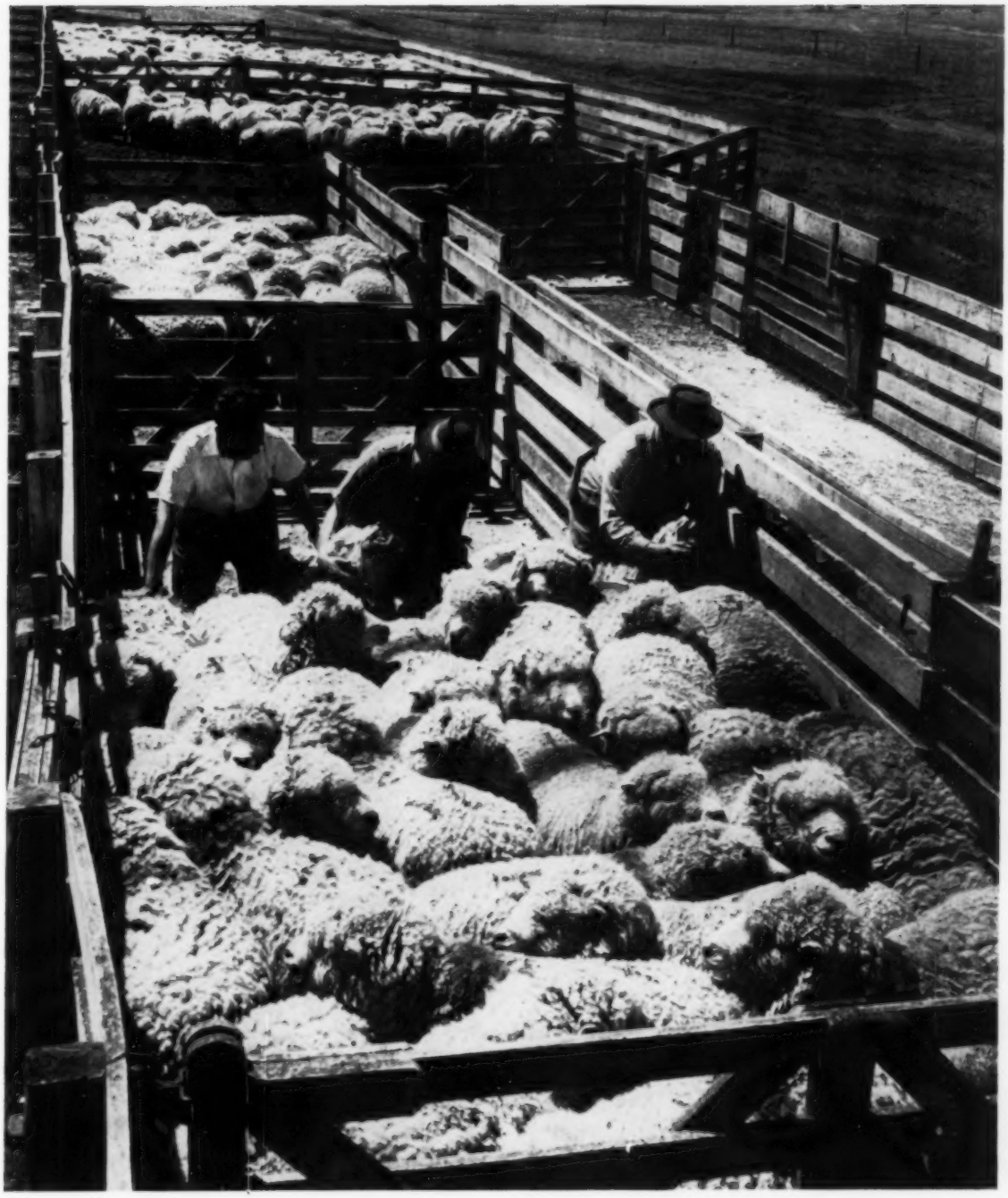
Winds of 60 miles per hour are commonplace in southern Patagonia, and not infrequently increase to 90 miles and over. Such gales greatly heighten the danger of grass fires, which menace the flocks and dwellings, as well as waste the vegetation. Perhaps for this reason, shepherds rarely smoke on the job, and exercise extreme care with their lunch fires.

Although the sheep have no natural enemies on the camp now, sometimes the forage is contested by guanacos, low-altitude relatives of the llama, and by the over-abundant upland geese whose appetite for grass is enormous. Rheas, South American ostriches, are often found feeding amongst the flocks, birds four feet tall, and often with a gaggle of young ones. Sometimes rheas are caught by means of lightweight *boleadoras*.

The shepherd rarely travels without this unique missile. Three balls of raw rubber, encased in leather, are attached to a leather thong. By whirling them around his head, then letting go, the shepherd can accurately entangle the legs of any creature he is pursuing.

From spring to fall, shepherds carry on their traditional activities, beginning with sheep-breeding in May, just before winter sets in. Lambs are dropped September-October, in the far south, and the little lambs gambol as gaily there as on English meadows. At the age of six weeks, the lambs are marked with the owner's stencilled brand.

Señor Carlos Felton, much like an English squire, is a practical farmer. He imports stud rams from New Zealand, such as this Corriedale ram, which carries about 30 pounds of fleece.



Shearing season offers a good opportunity to separate breeding ewes from those destined for the packing plant. The men study the teeth which denote good grazers.

Shearing time comes in December and January. Flocks of sheep are herded to the shearing-sheds, carefully timed to arrive there just as the previous flock is being herded back to its pasture. Gangs of itinerant shearers are Chileans, and eight of them with as many assistants, start on Señor Felton's flocks early in January.

Eight clippers, operated by gas-engine, whirr constantly, as the shearers mow through one fleece after another, averaging 150 each during the day. The rates of three cents for a ewe, six cents for a ram, run up to what is considered a very handsome salary. The assistants fill the bins with sheep for the shearers, carry off the fleeces for skirting, grading and wrapping. Then some fifty fleeces are pressed into large firm bundles, weighing about 500 pounds. It's a busy scene, as the sweepers keep cleaning up the tags, a mechanic

The shearing gang, most of them Chileans, with their assistants, pause briefly in the midst of their labours.

The lambs are separated from their mothers, during eyes, so the

looks after the gas-engine, the men shout, dogs yap excitedly. Only the sheep are "dumb before their shearers".

A cigarette-break comes at 11 o'clock. The shearers, wet with perspiration, their clothing stiff and shiny with lanolin from the fleece, throw a towel around their shoulders, gulp down a drink of water. The only sounds then are the wind rattling the galvanized iron roof, and the clamour of sea gulls. In twenty minutes, the clippers start again. Lunch is usually *puchero*, a stew of boiled mutton, carrots, potatoes and onions. The tea-gong sounds at 4 o'clock. The sweating shearers slump down for the luxury of a mug of tea with buttered bread. The patron and his manager have tea, also, prepared by the white-coated houseman. The *mozo* spreads a table in the engine-room with tea-cloth, sets out china, silverware, napkins.

After shearing, the shorn sheep are again paint-branded, and herded back to pasture. Some ranches put the sheep through a chemical dip at this time. The majority wait until after the meat sales of February and March, when they dip the reduced flocks.

Although only a third of Argentina's fifty million sheep are in Patagonia, they provide most of the fine apparel wools for export and for the country's expanding textile industry. Sheep in the northern provinces are predominantly the medium- and coarse-wool grades.

Wool rates received by the rancher scarcely reflect the market value of the wool. During the "high" year of 1951, top wool was bringing $2 a pound to the Argentinian government, but considerably less to the rancher who may not sell out of the country. In 1954, Felton was

during sh and the shepherds clip the fleece from around their so they to graze.

A heavily-fleeced sheep on its back is practically helpless, and would starve in 5-6 days without the shepherd's attention.

averaging 18 to 20 cents a pound for wool in the grease, about $2 per fleece. The rancher may sell to any Argentinian buyer, but these may not export, either. The government handles that end of it, and the difference in price goes into the national treasury.

Understandably, this regulation is not popular with the ranchers, nor is another which rules that four per cent of the stock must be available for local consumption at prices much lower than those offered by the freezing-plant.

It is unlikely that the industry can be expanded, however, since the land seems now to be carrying capacity flocks, Wind erosion and drought are a constant menace, and overgrazing is already evident. Nonetheless, sheep ranching in southern Patagonia has been profitable to those who pioneered in it.

The shorn sheep are paint-branded as they pass through the hurdles on their way back to pasture.

A farmer and his wife find pleasure in viewing the meter on their transformer pole.

Power Comes to Rural Saskatchewan

by ROBERT TYRE

THE RADIANCE CAST by Thomas Alva Edison's first electric light bulb in 1879 blazed the way to a new era in human living standards.

But it is doubtful whether Edison's invention drew as much applause in 1879 as it did 75 years later in the farming district of Wawota, Saskatchewan.

A modern electric light and power service came to Wawota and its surrounding farms on December 10, 1953. Nothing previously, not even the gaiety generated by the ending of a global war, equalled the high spirits of villagers and farmers gathered in their Community Hall to celebrate the advent of incandescent light.

Wawota's power celebration was accorded a good column of space in the *Moosomin Spectator*. The paper reported that for the occasion the stage of the Community Hall was "suitably decorated with a power line and the big words 'Lights Up, Wawota'." In telling of the evening's program, the *Spectator* said the *Story of Light* was presented by Rev. R.

McMurty "who took the audience from the time of Creation, when the only light was that of sun, moon and stars, through the time of the early bonfires, the lard wick, the coal oil lamp, the gas lamp, the 32-volt period, and finally to modern 120/240-volt power."

The village of Wawota in east-central Saskatchewan is just a small blue patch on the varicolored rural electrification map of the Saskatchewan Power Corporation. The map and its coloured areas tell the story of farm power development in Canada's Wheat Province.

Electricity, a commonplace utility in city homes, is still to thousands of Saskatchewan farmers and their families a new and delightful experience that many of them will not share for a few years yet. The story of light in those rural sections has not advanced much beyond the flickering flame of a kerosene lamp.

A few years ago a Rural Electrification Committee of British Columbia conducted a study of farm electrification in Canada. The committee's report to the B.C. Government had this to say about the Province of Saskatchewan:

> "In 1941 it is estimated that in Saskatchewan less than 300 farmers out of 139,000 were supplied with electricity from central energy plants. The 4.7 per cent shown in the Dominion census is made up almost entirely of individual gas and wind-driven plants. No organized effort has been made or is being made to serve the farm population."

This was the state of farm electrification in 1941. It was not much better in 1948 although by that year the number of individually-owned farms in Saskatchewan had dropped from 139,000 to something like 112,000, a trend that was to continue and which in some degree could be blamed on the lack of rural power facilities. Fewer farms meant fewer electrical installations, of course, but this way of easing the problem numerically was not to the liking of the Government of Saskatchewan.

The year 1948 is important, however, for it saw the Government move decisively to end the great kilowatt famine. An over-all farm electrification program was formulated and the 1949 session of the Legislature gave passage to the Rural Electrification Act.

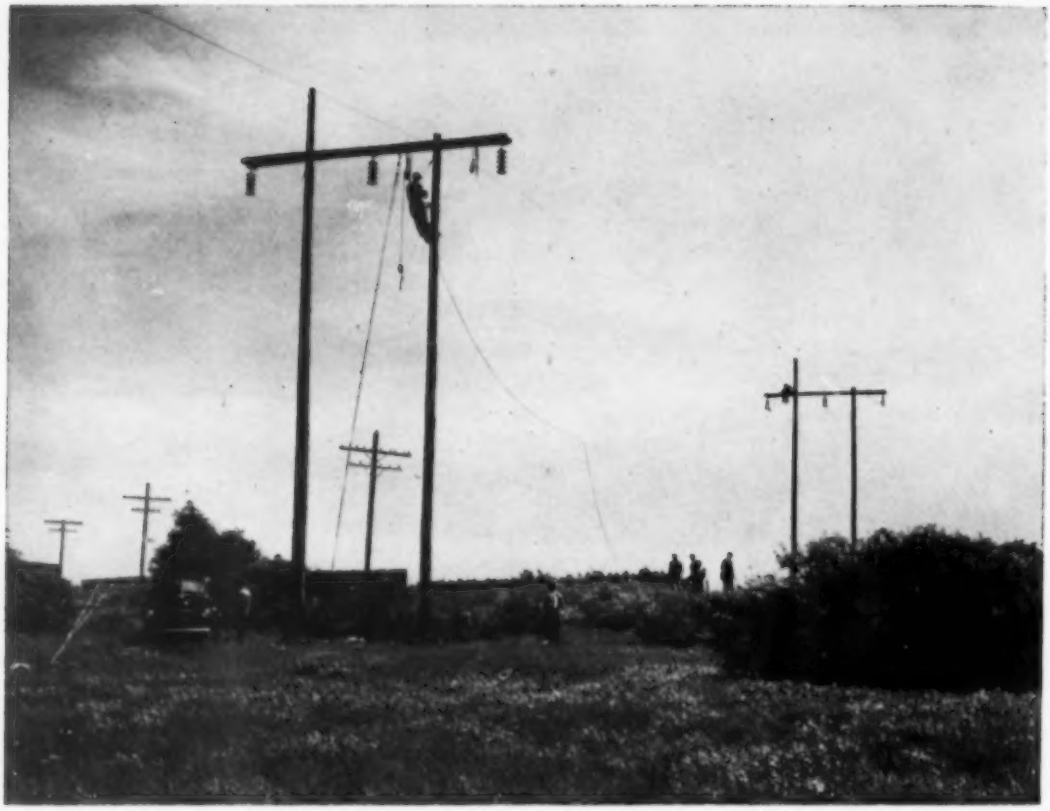
The lawmakers, their work done, tossed the statutory blueprint to their publicly-owned electrical utility, the Saskatchewan Power Corporation, and invited it to do the rest. The rest was just a matter of carrying to completion the largest farm electrification program ever undertaken in Canada. The magnitude of the job was clearly indicated by the map: a few isolated spots of colour — 1,300 farms on power in 1948 — in a great expanse of unelectrified white space. The logistics of the scheme were a trifle overwhelming. So many poles, so many transformers, so much wire — a network of lines whose total mileage would be as great as the distance around the earth.

From a slow start, occasioned by post-war material shortages, the "high lines", year by year, have been advancing at greater speed across the broad, flat croplands. Since 1949, the overlay of colour on the Corporation's rural electrification map — a bright patchwork of yellows, greens, reds, blues, purples and browns — has deepened and spread across the settled areas of Saskatchewan. At the end of 1955, more than 32,000 farm units had been joined to the provincial power system.

The delight with which the village of Wawota greeted the arrival of provincial light and power has been repeated in a hundred hamlets and thousands of farm homes since the electrification bill was passed in 1949. The simple act of flipping a switch to flood a room with light, power a vacuum cleaner, operate a churn, or drive a feed grinder, is to those long denied electric energy, a marvel of science every bit as wonderful as jet flight and the hydrogen bomb.

The male members of one Saskatchewan farm family celebrated push-button power by using their supply of old-fashioned lamp chimneys for rifle practice. They cheered as the glass tubes shattered, and the loudest cheers came from mother. To her had fallen the dreary task, daily for 25 years, of cleaning the smoky, greasy things.

To suggest that every resident of rural Saskatchewan goes into raptures over light and power would be stretching the truth. In almost every district that has prayed, pressed and petitioned to get it, there have been a few individuals who opposed electrification, mainly



Crews build a new 72,000-volt line from the city of North Battleford. Constructed in 1954, the new line was an important link in the Power Corporation's northern integrated power system.

for financial reasons. On one or two occasions the normal occupational hazards of stringing power lines have been heightened by the appearance of a wrathful farmer pointing a gun. The power crews are not paid to argue with guns. They leave that work to the persuasive members of the Field Representative Branch whose job it is to melt resistance to rural electrification and persuade farmers to allow poles to be erected on their properties.

Nobody as yet has intentionally fired a gun at power construction men but the Corporation still broods over the violence done to one of their power poles. The pole, quietly doing its job of supporting a transmission line, was literally cut in half by repeated blasts from a shotgun. The Corporation does not like to think that any rural resident would go to this extreme to register his opposition to rural electrification. It prefers to believe that the shots were fired by a city dweller, some peevish fellow who had had a bad day shooting at ducks.

The 25,000 miles of transmission lines that carry power to 32,000 Saskatchewan farms are the visual proof of the progress made in the province's rural electrification program. But behind this achievement is the story of a power development scheme that started from scratch and moved forward to grapple experimentally with farm electrification problems experienced by no other province of the Dominion.

Saskatchewan's electrification plan had two major obstacles in its path. (a) The great distances that had to be traversed by transmission lines and the relatively low concentration of customers in these areas. (b) The absence of cheap water-power necessitating more costly kilowatt production from diesel and steam plants. In the realm of economics these were tough nuts to crack.

The geographical vastness of Saskatchewan's main transmission area completely dwarfs the combined transmission areas of Ontario and Manitoba, and both these provinces have cheap hydro power. Saskatchewan's natural water-power sites are in the far north — a long distance from her southern centres of heavy settlement.

Saskatchewan administrations as far back as the early twenties had pondered the vexing problem of getting economical power to the farmers. The problem was temporarily shelved during the depressed thirties when the state of the provincial treasury made any scheme of taking electric power to the farms quite im-

practicable. Indeed, in that impoverished decade, many urban residents went back to using coal-oil lamps to save on power bills.

The war years and the immediate post-war period again focussed attention on the question of rural electrification in Saskatchewan. And this time it was a matter of more pressing and vital concern. The material demands of war and the post-war pace of economic development put increasing pressure on Saskatchewan agriculture to produce more and produce it more economically and efficiently. The weak spot in this accelerated program was the lack of electrical power on the farm.

The average Saskatchewan farmer is no horse-and-buggy practitioner. His seeding operation, crop management and harvest work are all highly mechanized. He uses the best of modern field equipment to get maximum crop returns from seeded acreage. In 1952, Saskatchewan's year of record grain production, the province's 112,000 farms produced 435,000,000 bushels of wheat.

In the fields, at the controls of his tractor or combine, the Saskatchewan farmer is a 20th century technician — but elsewhere on his farm, the farm without electrical power, he is still doing many things the way they were done in an earlier century. He may have a shiny new car at the door and wear a self-winding watch on his wrist, but the chances are that he is still drawing water by hand from a well, forking hay into a loft, and doing his evening chores by the light of an oil lantern.

There are 300 or more practical uses of electricity on the farm and in the farm home. In the early 1940s the majority of Saskatchewan's 139,000 farmers relied almost entirely on muscle-power to get the farm chores done. The farmer's wife in the unelectrified farm home had her share of drudgery too. She had no running water. She had none of the electrical appliances that make housework

Above:—Dairy farm equipped with an electric barn cleaner. Conveyor belt of cleaner can be seen in the gutter at the front of the cattle stalls.

Right:—Outside view of electric barn cleaner. The conveyor belt has just carried a load of dirt from barn to dumping terminal.

A main transmission line crosses the North Saskatchewan River near North Battleford. Poles bear distinctive markings to warn low-flying aircraft.

comparatively pleasant and easy. Quite often too, she was denied the small pleasure of listening to her favourite soap opera because of a dead radio battery. The farm wife could not but be envious of her city sisters with their electric lights, electric refrigerators, power washers and plug-in toasters.

With high-voltage power not available, many farmers did the next best thing and equipped their farms with small gasoline or wind-type generating plants. These power units delivered a very limited supply of energy which might be sufficient to light a house or barn with low voltage bulbs but was of little use for running powerful motors. They were frequently out of order and required a lot of maintenance. During long calm spells the wind-electrics were non-functioning. The gasoline plants usually chose a cold frosty morning for their breakdowns.

As well as making Saskatchewan farms more productive and profitable, electrification was viewed as means of checking the population drift from rural areas which was sharply reducing the number of farm units in the province. Another trend, also socially unhealthy, was the growing number of commuting farmers. This group established permanent homes in urban centres where their families could have the convenience and comfort of running water and electric power. From their city homes these farmers commuted to their farms in the growing season to do only the essential work of seeding, crop care and harvesting. The growing incidence of commuting farmers has brought about a sharp drop in livestock populations, contributed to the neglect of farm buildings and equipment, and created an economic problem for rural communities which depend on farm revenue for survival.

The Rural Electrification Act of 1949 was the legislators' prescription for remedying some of these morbid affections of the farm economy. The economics of the plan worked out by the Government had due regard for the special problems, physical and fiscal, of such a scheme in Saskatchewan. It had considered carefully the question of subsidies, noting that both Manitoba and Ontario were subsidizing their rural electrification programs by tacking the cost of it onto the bills of urban power customers. While this arrangement might work out reasonably well for two provinces with adequate supplies of cheap hydro power and much smaller capital investments in rural power systems, it did not seem to be a practicable approach to the problem in Saskatchewan.

Saskatchewan's scheme was put on a self-supporting basis. The schedule for rural power consumption was set at rates which, over a period of years, would amortize the capital cost of the program. The immediate obligation, the costs of transmission lines and generating works, was assumed by the Power Corporation.

The final part of the program concerned how much cash the farmer would have to put up to get a tap-off line built to his property. Average cost of this farm line, which might extend for 15 or 20 miles, was around $1,000 per farm. Percentage-wise, in the original planning, it was decided that the farmer would put up 60 per cent of the farm line and the Corporation the rest. However, in actual practice the farmer's contribution has averaged about $520. In some instances farmers paid a

low of $400 and a high of $600, depending on the density of farms electrified in a project area. The fewer the farms the higher the cost.

In return for the farmer's cash outlay of $520 Saskatchewan Power Corporation construction crews tap the 25,000-volt transmission lines to construct a 14,400-volt feeder line to a transformer pole on the farm property. The Corporation's responsibility ends when it makes the transformer installation, complete with cable running down the pole to a meter box. From that point on, the farmer makes his own arrangements for the hook-up to farm home and buildings.

These were the basic conditions laid down for taking provincial light and power to Saskatchewan's 112,000 farms. From there on it was the Power Corporation's job to get the power poles marching and the high lines strung.

The first year of the program, 1949, was a test year. In that year the Corporation only managed to bring the service to 1,200 farms but it picked up much valuable experience in the process which was put to good use in later programs.

It learned, for instance, that rural electrification goes forward much more smoothly when the people of a project area are organized to get behind the program and actively support it. It is not quite good enough to have a majority in favour of the project. Every single opponent of the scheme puts a heavier share of the initial cost on his neighbour and the Corporation. And besides, a farmer lost to the project means a substantial loss of power revenue over the years.

The field men of the Corporation seek the help of the people most enthusiastic about electrification. They are urged to get out and sell the program to their less power-conscious neighbours. This local missionary work is followed up by public meetings in the area at which the field men explain the project in detail and invite questions.

Farmers and their wives crowd little country

For the past five years farmers have attended meetings such as this, held in a country schoolhouse, as the preliminary to a new farm power project.

Typical scene in an electrified farm home.

schoolhouses to hear the case for rural electrification. And it does not hurt the Corporation's cause if the meeting is conducted in a building dimly lit by coal-oil lamp and where the audience has recourse to a bucket of well water to quench its thirst. These are useful aids in pointing up the blessings of electrical energy.

The burly farmers, their knees squeezed under desks built for seven-year-olds, puff thoughtfully on pipe or cigarette and give complete attention to the Corporation field man explaining the economics of the scheme, how the cost of it can be reduced by co-operation and self-help, the materials required and the construction work involved, and finally the bright, entrancing picture of electricity at work on the farm.

The field men of the Corporation eschew fancy phrase-making and poetic descriptions, in stating the case for their product. Fairy Prince with a Magic Wand may be a picturesque way of describing electric power but Saskatchewan's practical farm people prefer the information that electricity will operate a hay bailer for them for the sum of 9 cents a ton; a milking machine at a cost of 6 cents a cow per month; a green feed cutter for 8 cents a ton. Farmers accustomed to the long, tedious chore of pumping water by hand nod approvingly when the field man mentions that an electric water system will supply all the water they need on the farm for something less than 5 cents a day. A farmer may be an argumentative and stubborn type but he will come away from the

meeting convinced, or nearly so, that electric power is the way to easier, better and more profitable farming.

The farm wives get their side of the deal too. They are introduced to the kilowatt-hour and what it means to the farm home in terms of modern living, convenience, comfort and leisure. From experience field men of the Power Corporation know that a wife won over to electrification often means the winning over of a reluctant husband.

The country residents who give freely of their time to urge and promote power projects in their areas are the unsung heroes of rural electrification. With the blessing of the Power Corporation, they make the rounds signing up individual farmers for the scheme, work assiduously and persuasively to bring some unwilling farmer into the plan, prepare maps of the area to be served, and arrange for easement right-of-way for transmission lines.

Among the thousands of project maps in the files of the Saskatchewan Power Corporation is one designated W.O. 34-129 Kennedy-Wawota Rurals. Also inscribed on this blueprint are the words: Committee head, G. Lincoln, Wawota.

W.O. 34-129 was a power project undertaken in 1953 which brought electrical service to 90 farms in an area extending south-east from the town of Kennedy to the village of Wawota. Mr. Lincoln's name on the map is there by virtue of the fact that he probably worked harder than any other farmer in the district to bring the power to Wawota.

A long time before W.O. 34-129 came into existence on the drafting board, Reeve George Lincoln of Wawota was spreading the gospel of electrified farming among his neighbours. And to help things along faster, Reeve Lincoln and the members of his municipal council furnished the Power Corporation with a map to show the locations of all habitable farms in the area and those farms that were interested in taking power.

When the Power Corporation indicated in the fall of 1952 that it would serve the area with electricity if two-thirds of its farmers could be signed up for the project, Reeve Lincoln mobilized the local power enthusiasts and formed a canvassing committee. Committee members toured the district campaigning and signing up farmers; meetings were held to win over the anti-power group; the Wawota Board of Trade threw its weight behind the drive.

When all this effort failed to produce the required 90 signatures, some investigation disclosed that a number of farmers were holding back because they could not put up the entry fee, in Wawota's case $480 per farm. With this discovery, the Board of Trade went into action. It borrowed a total of $3,000 from 13 local citizens and the cash-short farmers were loaned sufficient money to complete their applications for power. And the project had its 90 signatories.

At this point, power project W.O. 34-129 was taking form in the drafting room of the Power Corporation. The blue lines on the map traced the route of a 23-mile-long trunk line that started from the electrified town of

The mark of an electrified farm is the tall transformer pole with its network of wires spreading out to farm home and buildings.

Aeroplane patrolling a transmission line. Numbered boards on selected poles assist the pilot to locate trouble areas.

The electric water pump on the farm is one of the many boons of electrification.

Kennedy and travelled straight south to the farm of L. Smith where it veered east and carried on to the village of Wawota. From the trunk line, branch lines diverged to serve the new customers.

When the construction crews had anchored the last of the 1,700 poles used in the project and installed the final transformer, then did the village of Wawota and its farmers proceed to the Community Hall to hold their gala power celebration.

All told, the Wawota project had cost $118,000. The 90 farmers receiving power put up a total of $45,000, and the balance, with the exception of $1,800 charged to the village of Wawota, was borne by the Corporation. In this instance, the Power Corporation assumed a heavier burden of the cost because of the construction of a three-phase transmission line, instead of the usual single line. The transmission line at Wawota was to become part of a main network which would go on to serve other areas.

A footnote to the case history of the Wawota project might properly include the information that a number of the farmers participating made use of a financial aid plan introduced in 1952 by the Corporation. Under this plan, one-third of the farmers in a project can finance two-thirds of their construction charge over a period of three years at an interest rate of five per cent. Actual cash outlay of the Wawota farm group was $34,000. The balance of $11,000 was loaned by the Corporation.

The reverse side of a Canadian dollar bill, the newest series, will help to explain why the Saskatchewan Power Corporation gives every encouragement to local volunteers who show a willingness to obtain easement right-of-way for power lines.

The prairie scene (Saskatchewan, probably) portrayed on the back of the dollar bill shows two lines of poles, parallel to and separated by a country road. There is this difference between

An extension to the Estevan steam plant of the Saskatchewan Power Corporation will be completed in 1956, with an addition of 30,000 kilowatts increasing capacity to 75,000 kilowatts. Excavation for the new addition uncovered a bed of lignite coal which was made use of in the plant's boilers. Fuel used at the plant comes from lignite coal mines in the Estevan area. The Power Corporation's program for the future calls for a new and larger plant at Estevan.

the poles: the ones pictured on the left side of the road carry telephone lines. They stand on the road allowance. The poles on the opposite side support power lines. The power poles are off the road allowance, set up on farm property.

Consent of the farmer is always sought before the poles are erected on his property. Under the Power Corporation Act the utility can, by paying a fair price for the land, override opposition to poles on farm property but much to be preferred is a friendly acquiescence. This permission is called an *easement* and it is not always the easiest thing in the world to attain. Indeed, some farmers have been known to get quite hostile in refusing right-of-way to power lines. They want to know why the Saskatchewan Power Corporation cannot build its transmission lines on road allowances as is done in Manitoba and other provinces. It is a good question and people soliciting easements go into some careful detail to explain the "why" of it.

At the beginning of the rural electrification program the Corporation did construct some of its power lines on road allowances. But before it got very far with this program it began to hear loud protests from rural telephone companies. The power lines were too close to the telephone lines. The higher voltage carried by Saskatchewan's single phase lines was interfering with sound transmission.

The trouble, of course, was the road allowance. In most of Saskatchewan it is only 66 feet as compared with Manitoba's 99 feet. To cope with this problem of interference, the Corporation began constructing its power lines 150 feet back from the centre line of the road. This entailed going onto farm property, but not before someone had called on the owner of the property to get his approval. And the Corporation has been quite happy to leave this task to local people. Neighbours and municipal officials are often quite successful where a Power Corporation man would meet with refusal. However, easements are no longer so much of a problem. Farmers have come to accept without question the building of power lines along the margins of their properties. Most of them realize it has to be this way if they are to have trouble-free telephone communication.

Because of the high cost of farm electrification in Saskatchewan the engineers of the Power Corporation have kept well in the forefront of their planning a readiness to make use of any new ideas or reasonable alternatives which would achieve economies without limiting efficiency. To this end they did some pioneer work in the use of the single-phase ground-return distribution system. This simply means making use of the earth as a conductor of electricity. The conventional farm circuit is a two-wire system, consisting of a phase

Electrified workshop near Regina. The farmer is using a power lathe. Two power saws can be seen in the background.

A self-help power project. This farmer is installing a power pole with the aid of his tractor and an improvised pole-setter—a loading device used for many farm chores.

line and a neutral conductor. The electric current flows out over the phase wire and makes the return trip to transformer points via the neutral conductor. By using the earth as a conductor of electricity the second wire is eliminated at a considerable saving in materials and labour.

The single-wire earth-return system is now standard practice in Saskatchewan's rural area. Doing the job as well, if not better, than the two-wire system, the earth conductor has cut construction costs sometimes by as much as $500 per mile. The single line carrying 14,400 volts only requires 14 poles to a mile of construction, whereas in Manitoba, where two lines with 7,200 volts are used, some 20 poles are needed for a mile of construction.

Self-meter reading was still another way of reducing the costs of Saskatchewan's farm electrification. After taking into account the long distances involved and the travel problems presented by bad weather, the Corporation decided that it would be more practical to let the farmers read their own meters. A device called a cyclometer dial — much like the speedometer on a car — made the reading of the meter simple and easy. The customer receives a supply of special cards, completes one each month and returns it to the head office of the Corporation in Regina. A meter audit is conducted once a year. The arrangement has worked very well.

A self-help program of farm line construction has pushed the pace of electrification and earned money for the farmer which he has used to help defray the cost of his own farm system. This plan has been very helpful in areas where farmers were short of cash.

Self-help projects are under the supervision of a Power Corporation foreman. The foreman briefs his farmer recruits and provides them with a booklet containing operating procedures. The farmers dig pole and anchor holes, load, haul and erect the poles, and do the tamping. Regular Corporation crews string the wire and make the connections.

Corporation employees have been impressed by the speed and efficiency shown by the self-helpers. One group of farmers set and tamped 90 poles in one day, well above the average for regular crews.

Rate of pay on self-help projects is around $6 per pole. The total earned is divided evenly among the members of the group. Approximately 400 of the farms electrified in 1954 were self-help projects. More of these projects will probably be developed in the future.

Aircraft now do one job for the Power Corporation which was previously carried out by truck or automobile. In 1953 the Corporation sent its engineers aloft to do the preliminary mapping and plotting of proposed project areas. The new method was found to be more economical and accurate, and decidedly faster. A project area of 50 farms can be surveyed from the air in less than two hours. The same job handled by a ground crew would require two or more days to complete.

Piloted in hired planes, the Corporation's engineers do their surveying at 500-foot altitudes. They can, in one pass over any given piece of territory, record all the information essential to power line construction over a one mile swath, sometimes more. Every hill, ravine, slough or lake is accurately plotted on a map. The airborne engineer notes the location of farms, the position of telephone lines, the number and condition of roads in the area, and where trees and brush and other obstacles are situated. While passing over a farm he

checks its over-all appearance to see if it might be a likely prospect for electrification.

The data gathered in an aerial survey becomes the basis of a new electrification project. Preliminary surveys for the 1954 and 1955 programs were all done from the air. The cost is small, just 50 cents per farm in typically populated areas.

In the early months of the electrification program the Corporation singled out for attention areas of greatest farm density. Materials were in short supply then and could be used to greater advantage and more economically where farms were most thickly concentrated. For example, in some north-east sections of the province there are as many as 80 farms to a township while in the south-west there are townships with just 12 or 14 farms. A township in Saskatchewan is six miles square and contains 36 sections. The average municipality in the province has nine townships.

High farm density alone did not automatically qualify an area for electrification. Considered, too, was where the power was most needed to assist the farm operation. Grain farms, with their gasoline-powered machines, were rated as less needy than mixed farming operations which had livestock to feed and water, and cattle to milk.

When construction materials became easier to get, the demands for electrification increased and the Corporation widened the scope of its operations. Trying to satisfy these requests from diverse areas of the province it found itself in the position of a sailor steering a course through uncharted waters. The farmers in one township might want power and merit power but the decision as to whether they would get it now or later might hinge on the conditions that existed in adjacent townships. In the economical planning of power networks it was essential to know the condition of farms and their density in all townships. This was information the Power Corporation did not have in 1950 and it took steps to get it.

The councillors of Saskatchewan's 306 municipalities were asked to do the job and in the spring of 1951 they began a survey to establish on the maps of their respective municipalities the locations of all habitable farms and also to indicate which farms favoured electrification. The Power Corporation consolidated all this information in large maps and used it to plan the layout of farm and main trunk lines that would ultimately be required to serve all farms, hamlets and villages in project areas.

From the results of this survey evolved a new policy called "Area Coverage". Under this system farm lines were designed on a basis of complete coverage and at the same cost for each farm throughout an area that might include three or even four municipalities, provided there was no great variation in the number of habitable farms in a township. Area coverage required two-thirds of the farms in an area to accept power. Later on, this regulation was revised to permit a smaller minimum of signatures where the population in townships was denser.

Before Area Coverage was introduced farms were electrified on a straight mileage basis, with varying limitations on the distances lines could be extended, and the cost assessed in accordance with labour and material requirements of each farm unit. A few areas, not eligible for group coverage, are still being dealt with on a straight mileage basis.

Despite the problems of distance and cost, the transmission lines of the largest farm electrification program in Canada have spread far in a short time.

From the day of the province's birth in

A transformer pole goes up. Group of farmers on a self-help project raise this pole in a farmer's yard.

Exterior view of the new gas engine plant at Swift Current. The new plant draws its fuel from the natural gas field at Success, Sask. The station, with a capacity of 55,000 kilowatts, was officially opened in September 1955, by Public Works Minister James Darling and the Power Corporation's general-manager David Cass-Beggs.

1905 to the passage of the Rural Electrification Act in 1949 less than 1,300 of Saskatchewan's 112,000 farms had the benefit of electricity from provincial power stations.

Year by year since 1949 the work of bringing light and power to Saskatchewan's 600,000 rural citizens has moved forward with greater speed and efficiency: 1,200 in 1949; 2,400 in 1950; 3,600 in 1951; 4,500 in 1952; 5,500 in 1953; 6,500 in 1954, and 7,500 in 1955.

In less than seven years the Saskatchewan Power Corporation has increased the total of electrified farms from 1,300 to 32,000. If it achieves its goal of another 7,500 farms electrified in 1956, it will raise the total to 40,000, and this conceivably could be the half-way mark.

The trend to fewer farms, the growing number of absentee farmers, holdings classified as farms but too small to justify the investment for power, these and other factors may reduce the number of farms that can be brought within the scheme to 80,000.

The half-way mark of 40,000 farms for Saskatchewan is the full distance for her neighbouring province, Manitoba. The province to the east recently completed its rural power program with 42,000 farms electrified. Saskatchewan, with a transmission area of more than 125,000 square miles, four times greater than Manitoba's, has every expectation of completing the big job in four or five more years.

The impact of power on Saskatchewan's 32,000 farms has had an exhilarating effect on the whole economy, and particularly in the province's appliance shops. Rural electrification has opened up a vast new market for electrical appliances and equipment.

Statistics compiled by the Power Corporation show that farmers will buy a total of $2,000,000 worth of electrical equipment for every 1,000 farms electrified. This means that Mr. and Mrs. Farmer will pour into the cash registers of retail stores and wholesale houses something like $64,000,000 for wiring, power apparatus and home appliances before they are finished equipping the 32,000 farms electrified to the end of 1955. And this does not take into account money spent on electrical appliances by the people in the more than 700 rural communities now served by the Corporation.

The Saskatchewan Power Corporation itself is a mammoth consumer of electrical equipment. To meet the requirements of its stepped-up farm program, it now receives more than 1,300 carloads of materials annually. These shipments include 85 carloads of cable from eastern factories, and 670 carloads of poles, some from British Columbia but the major

part from the forests of northern Saskatchewan.

The Corporation's consumption of distribution transformers — 22 carloads in 1954 — brought about the establishment of a new industry for Saskatchewan. The Pioneer Electric Company in Regina now builds the transformers for Saskatchewan's farm lines. Circuit-breakers are shipped in from a Manitoba firm, which came into being as a result of the electrification program in that province.

It was in 1929 that the principle of public transmission and distribution of power was established in Saskatchewan with the creation of the Saskatchewan Power Commission. It began operations with a staff of four people, and no power plants, no transmission lines, and no distribution systems.

Starting from nothing, the power utility in 25 years built an organization which maintains 30,000 miles of power lines, serves 120,000 customers, and employs almost 1,200 people. It operates steam-generated plants at Estevan, Saskatoon and Prince Albert, and 12 diesel plants in other parts of the province. Net kilowatt hours distributed by the utility last year totalled more than 500,000,000.

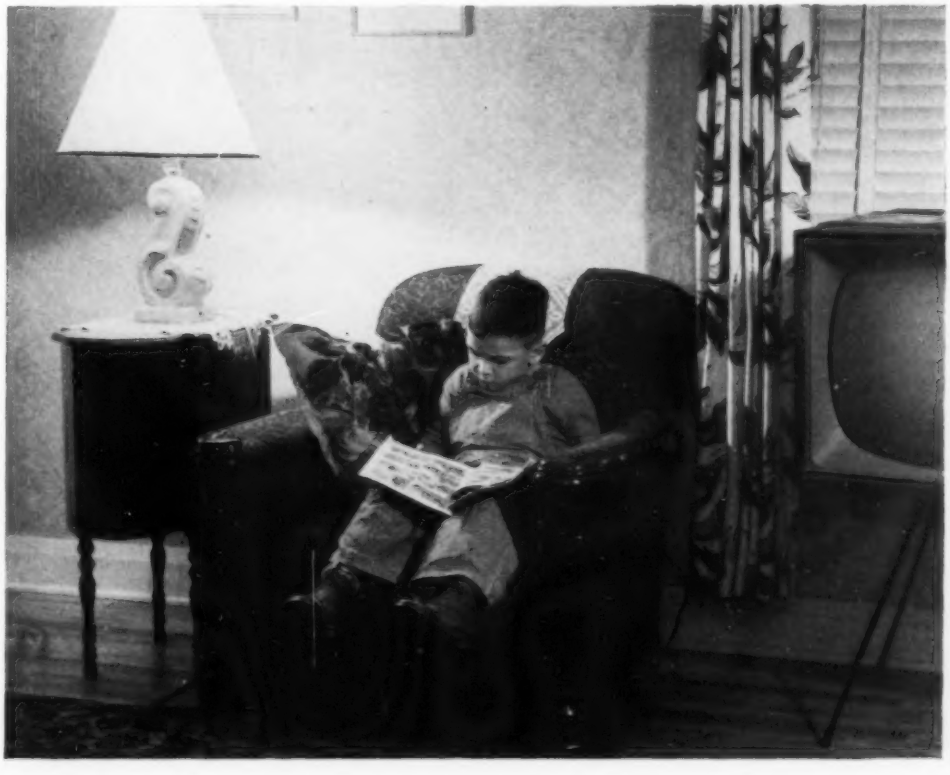
In February, 1949, the year the Rural Electrification Act was passed, the status of the Saskatchewan Power Commission was altered to make it a Crown corporation. The Saskatchewan Power Commission was retained as a regulatory body to deal with the operations of those municipal utilities still functioning in the province. And as a corporate property, the Saskatchewan Power Corporation thus became the main utility in the province dealing with the production and distribution of electrical service.

Rural Saskatchewan is delighted with its new electrical way of life and the Saskatchewan Power Corporation was delighted to receive this tuneful tribute to incandescent light from one of its farm customers — a parody on the song "When You and I Were Young Maggie":

Ah, but something I saw on that hill, Maggie,
Just made me stop and stare,
There are poles to be seen on the hill, Maggie,
And wires are strung everywhere,
For power has come to the hill, Maggie,
And lights up the homes all around.
Many changes we've seen in our time, Maggie,
But this is the best that we've found.

CHORUS

For power has come to the hill, Maggie,
And lights up the homes all around,
Let us sing of the days that have come, Maggie,
With farm yards agleam like the town.



This young farm boy reads his book by the light of an electric lamp. The TV set to his left is something the farmer could not enjoy until electrification reached his farm.

The Sign of the Fish

by ADELAIDE LEITCH

THE PROVINCIAL coat of arms of Newfoundland is not a cluster of fish flakes and stages, rampant on a field of Atlantic blue—but it could be.

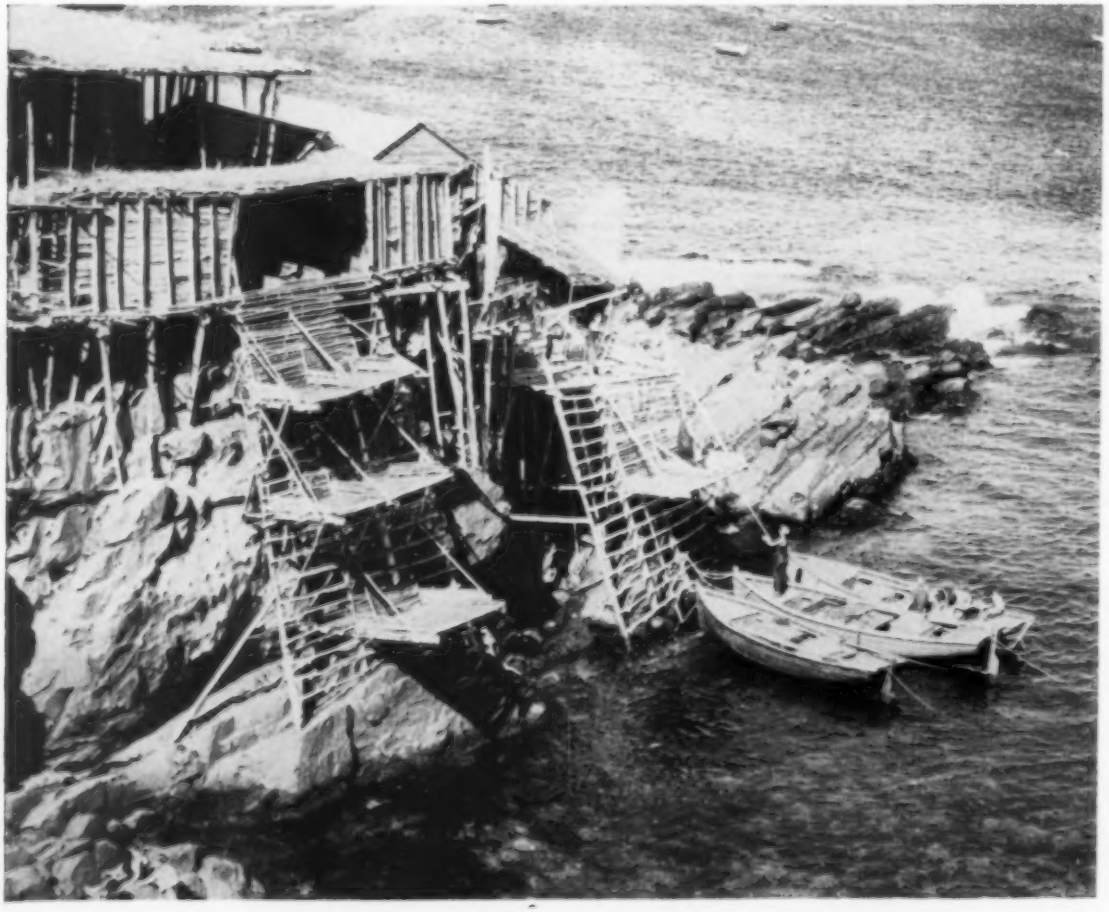
These matchstick contrivances cling by their toenails around the whole rugged coast of Newfoundland, in coves and tickles and runs from Cape Race to Ha Ha Bay, and their Labrador counterparts march determinedly north toward Ungava.

Visitors are always sure that the first breeze will dislodge them. It never does. Standing on their spindly legs, they defy the Atlantic blizzards, the breakers that thunder in from the outskirts of the Labrador current, and the winds that get up gale velocity by rushing across a whole, heaving ocean. A fisherman's tilt or two may be flattened, a belated schooner piled on the rocks. But usually, when the debris is cleared away, there sits the sign of the fish, looking as if the first breeze would dislodge it.

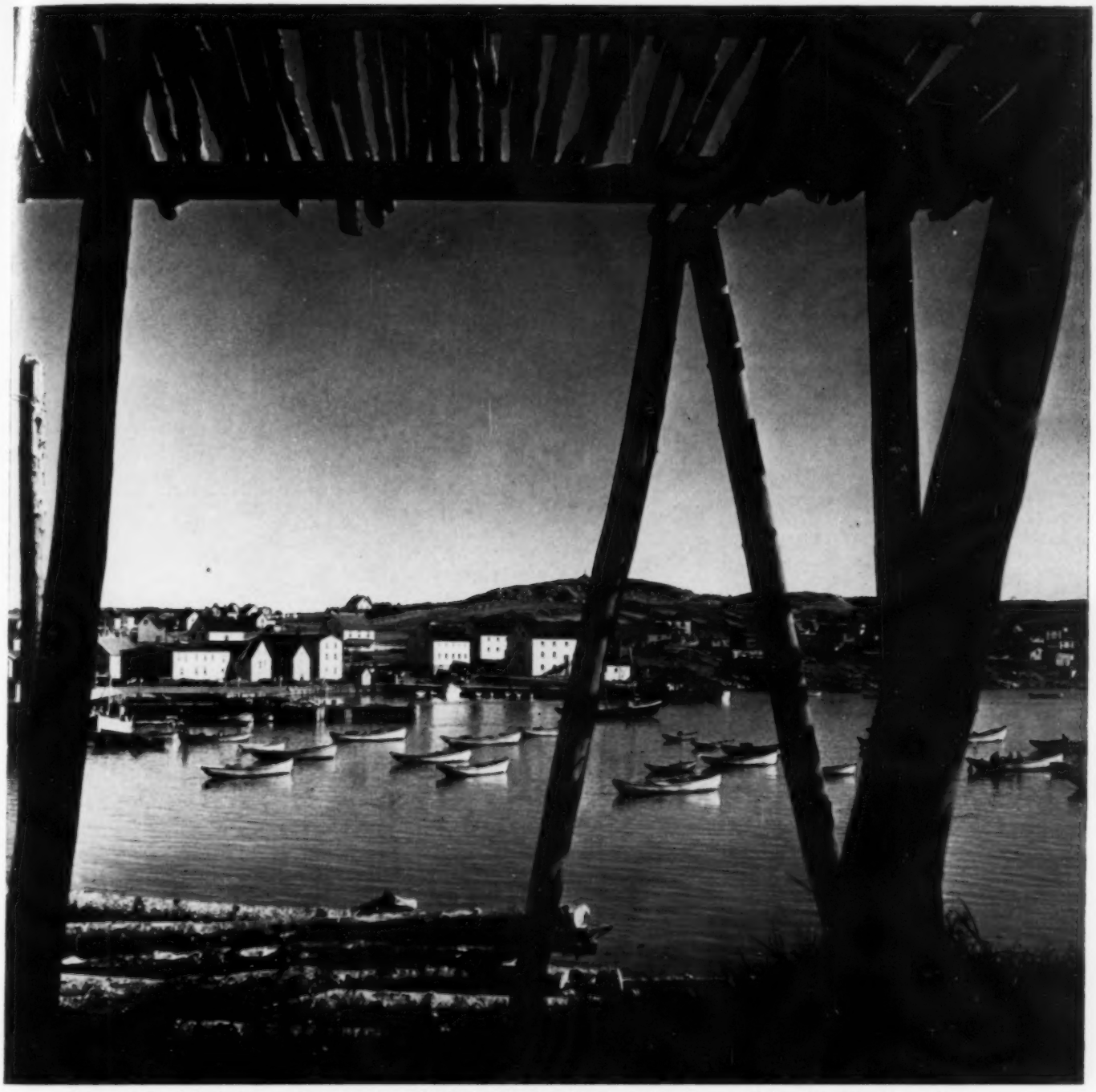
The drying stages, or "flakes" of Newfoundland are simply great, flat racks, made of small timbers in the round, strong enough to hold a fisherman walking out with an armful of cod, but light enough for the air to circulate. Frequently, they are covered with spruce boughs or other small branches and, on these, the cod are laid.

The landing stages range from purely utilitarian affairs to spectacular ones that cling to sheer, steep rocks. Often, several stages must be set in 'tiers' so that the fish can actually be landed and pitched from stage to stage until they reach the top.

The tourist and the artist invariably head for Pouch Cove on the southeast tip of the Avalon Peninsula, and the stages clinging to the rocks of this picturesque little outport are probably the most photographed bit of Newfoundlandiana on the whole island. But there are less accessible spots, such as Spillers Cove on the big Bonavista Peninsula, where cliffs



Most photographed fishing outport of Newfoundland is Pouch Cove. Fish are pitched up from the bottom of the cliff, from one landing stage to another.
Melba Lent.



Through the fish flakes at Bonavista, small fishing boats ride at anchor in one of Newfoundland's major fishing centres. Although modernization has come to the island, the ancient method of drying fish prevails in the coves and tickles of this Tenth Province. Adelaide Leitch

rise like great stalagmites from the ocean and the fish stages are not just spectacular but unbelievable.

Wherever Newfoundland fishing is "wonderful good", there you find the flakes and stages. Even on the harbour front of St. John's itself, cod are spread to dry in the sun, with the roofs of waterfront warehouses serving as "flakes." Transatlantic ships calling at St. John's, sealers bound for the spring kill, Grand Bank trawlers, all move out through a flanking of drying cod for the fish flakes stand even along "The Narrows," that perfect, rocky entrance to the city's natural harbour.

The traditional manner of drying fish in Newfoundland has been passed down from the earliest settlers. It is as methodical as the turning of a flapjack on an outport stove, and

Next-door-neighbour to St. John's is the tiny fishing village of Quidi Vidi, where fishermen dry their catch behind an almost-hidden harbour entrance from the Atlantic. Adelaide Leitch

not too different from it. Too much sun will burn the fish, too little will make it slimy; a heavy night's dew is as bad as a day's rain, and the whole family pitches in to watch the fish, turn it, gather it up in great, stiff armfuls at night, and store it away when it is finally 'done'.

Before drying, the cod has been cut and cleaned in an operation that looks deceptively simple under the experienced hands of the fishermen. A gutted cod is slit down one side; a diagonal cut is made across the vertebrae near the tail, and the bone is ripped out. After that, it still must be salted and stored; later washed again and dried in the sun.

Newfoundland's first homes were fishermen's homes, erected long before it was even permitted to erect permanent dwellings. Often, the flakes and stages were in place before the homes were completed. England for many years chose to ignore this breach of her orders, and continued to consider Newfoundland a great ship strategically anchored off the Americas. Even when John Cabot spoke of the "waters teeming with cod," England was slow to realize that this wealth of the sea would one day be a greater and more sought after prize than the riches he sought in India.

Modernization has been coming to Newfoundland in the last few years, with new methods of fishing such as long-lining, Danish seining, deep water dragging and other means. But all around the coast, the flakes and stages still stand, where men of Newfoundland dry their fish under the Atlantic sun and wind in the manner of their forefathers.

If you ask these men if they are getting any fish, they'll grin at you over a full boatload and reply in the cautious Newfoundland idiom, "Just a sign, b'y . . . just a sign!"

But the real 'sign' of fish is in the fish flakes and the fish stages rearing up on their ungainly legs all over the coasts of Newfoundland.

EDITOR'S NOTE-BOOK

Charles W. Dill (*Wings Over Ontario*) obtained his knowledge of the work of the Air Service Division of the Ontario Department of Lands and Forests as a member of the staff of the Department. He is now employed by a publishing house.

* * *

Richard Harrington (*The Sheep Ranchers of Patagonia*) is widely known for his photography. He has travelled in many lands and has recorded his impressions vividly with camera and pen. His work has often appeared in the Journal in the past.

* * *

Robert Tyre (*Power Comes to Rural Saskatchewan*) was born in Scotland but reared and educated in Canada. A graduate in journalism from the University of Manitoba, he has had rich and varied experience as a writer of radio drama, editor of R.C.A.F. publications during World War Two, and newspaper editor in Saskatchewan. His biography of the late Dr. Murrough O'Brien, *Saddlebag Surgeon*, won the Canadian award for biographies in 1954. Now director of publicity for Saskatchewan's Industrial Development Office, he tells us that in his spare time he is adding the finishing touches to his first novel.

* * *

Adelaide Leitch (*The Sign of the Fish*), whose articles often appear in the Journal, has travelled extensively in Canada and Europe, writing and taking photographs along the way. Her fresh and perceptive views of places, people and things are a constant source of pleasure.

LETTER TO THE EDITOR

November 9, 1955

To the Editor,
The Canadian Geographical Journal,
Ottawa.

Dear Sir,

In your June 1955 issue, on p. XIV, Dr. Douglas Leechman, in his review of Blodwen Davies' book on Ottawa, deplores among other things the fact that there is a discrepancy between A. H. D. Ross (*Ottawa Past and Present*), who claims that Philemon Wright, the founder of Hull, was born in the county of Kent, in England, and Miss Davies and myself (*Ottawa Old and New*), who on the contrary wrote that Wright was from Woburn, Massachusetts. Dr. Leechman also adds that he reposes "most confidence in Ross". By this short sentence he implies that Miss Davies and myself are wrong, and for this reason I believe I am entitled to defend my writing.

I admit that much too often it happens that authors writing history derive their information from previous writers without checking or criticizing carefully the sources which have been used. But knowing perfectly well that a history written from original sources is far more reliable than one drawn from secondary sources, I have always tried, as much as possible, to obtain my material from ones of the former category.

In this particular case concerning where Wright was born, I may say without discrediting Ross's work that I have used Philemon Wright's own words. These were taken from a statement which he made to a committee of the Legislative Assembly of Lower Canada, appointed on November 29th, 1823, to study settlements on Crown Land. In this statement, he said that his parents had come from the county of Kent, in England, to the province of Massachusetts, where he was born in 1760 (near Woburn).

Before I published this information in 1942, all the authors whom I had read had repeated what Ross wrote, I do not know Miss Davies' source of information on this point, but when she mentions Woburn as Wright's birthplace, she is certainly not wrong!

Faithfully yours,
LUCIEN BRAULT,
Honorary Historian of the City of Ottawa.

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The Canadian Geographical Society

ANNUAL MEETING

The Society will hold its twenty-seventh Annual General Meeting in the Lecture Hall, National Museum of Canada, Ottawa, on Tuesday, 13 March 1956, at 8.30 p.m. Dr. L. W. Brockington will address members of the Society and their friends on

"The Canadian Geographical Society and Its Mission."

THE TRAVEL CORNER

The gardens of Morven in Albemarle County, Virginia, were restored in 1930 and today are superb. The house dates from 1796.

Photographs by Virginia Dept. of Conservation & Development

Historic Garden Week in Virginia

For one week every year the State of Virginia opens a large number of its private homes and the gardens and grounds of its beautiful estates to the public. This year Historic Garden Week is being held 21-28 April. Of the 339 places open to the public during that time about two-thirds will be private property. In most cases, visitors will be permitted to see both gardens and homes. A few estates, however, will admit visitors only to the gardens.

Virginia is justly famous for the beauty of its countryside in the spring. Snowy white dogwood and purplish-pink Judas trees bloom beside the highways. The parks and gardens offer delightful vistas of roses, wildflowers, tulips and many other flowers, while on large estates velvety lawns, boxwood, topiary work, and statues of lead and stone recreate the dignified and serene atmosphere of another era's more leisurely way of life.

The Garden Club of Virginia sponsors Historic Garden Week. The proceeds from admission fees are used to restore grounds and gardens of places of national historic importance. At present the club is engaged in restoring Woodlawn Plantation near Mount Vermont. Each year some private homes and gardens are removed from the list of those open to the public, for it is not always convenient for an owner to show his property year after year, although many do so; but there are new places added to the list annually. Besides the private ones accessible only during Historic Garden Week there are certain others which are always open.

In Alexandria, Fredericksburg, Leesburg, Richmond, Williamsburg, Charlottesville, and Staunton there will be special tours and exhibits, as well as the display of gardens and homes. Alexandria, for instance, will have a special exhibition of paintings borrowed from the Metropolitan Museum of Art and the Virginia Museum of Fine Arts. Elsewhere in the state there will be displays of old silver, china and glass. The mansions open to the public include *Monticello*, the home of Thomas Jefferson, and *Stratford*, the birthplace of Robert Lee. One of the handsomest of estates to be seen is *Brandon Plantation*, about 45 miles east of Richmond. It is open to the public for the week. In every section of the state where properties are on display luncheons will be served by church groups for the convenience of visitors so there will be ample opportunity to sample southern cooking as it is done in Virginia's homes.

About the middle of this month a special guide-book is to be issued for Historic Garden Week. Anyone interested in visiting Virginia at that time who would like to obtain a copy and a map may do so by writing to the Virginia Department of Conservation and Development, 914 Capitol Street, Richmond 19, Virginia, U.S.A.

Travel and Study on British Council Scholarship

The British Council has issued a reminder that it offers scholarships to Canadian students for advanced study and research in the United Kingdom. These scholarships, normally tenable at universities and other educational institutions, are mainly awarded to holders of university degrees or persons with equivalent professional or practical qualifications. Usually the entire scholarship period is spent in the United Kingdom. Most of the scholarships are for one or two years, commencing 1st October. Fares to and from the United Kingdom, tuition fees, personal maintenance grants, grants for books and apparatus, and approved travelling expenses in the United Kingdom are included in full scholarships. Applications and requests for

(Continued on page X

Hostesses in colonial dress at Williamsburg. The Palace of the Royal Governors may be seen behind them.

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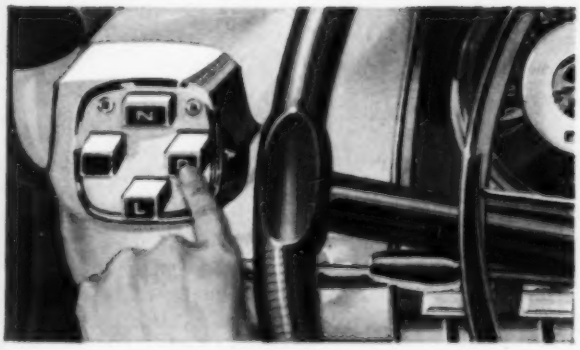

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(Continued from page VIII)

further information should be dressed to Mr. Gordon Huson, sociate Professor, School of Busi Administration, University of V ern Ontario, London, Ontario.

Roads of the Future

Some day the Trans-Canada H way will be completed and, when we understand that it will be link with a 3,500-mile highway in th United States known as the Gre River Road. This four-lane highwa will follow the Mississippi River nort from the Gulf of Mexico. When com pleted the two highways will giv Canada and the United States 8,50 miles of exceptionally good road nort and south, east and west.

Cunard's *Carinthia*

The new Cunard liner, *Carinthi* which was launched in December b H.R.H. the Princess Margaret, wi sail on her maiden voyage from Live pool to Quebec and Montreal on 2 June. The ship is similar in externa appearance to the *Saxonia* and *Iverni* which entered service in 1954 an 1955 respectively. She will be capabl of carrying 154 passengers in firs class and 714 in tourist class.

Thrift Tour Tickets

Before crossing the Atlantic Ocea to visit Great Britain many peopl from this continent have purchase the British and Irish Railways' thrif tour tickets which permit 1,000 mile of railway travel in Great Britai for $20 in third class or $30 in firs class. This very economical arrange ment was recently extended to includ railway travel in Ireland as well a Great Britain. Thrift tour ticket cannot be purchased overseas, bu must be obtained before leavin North America.

Coming Events in Venice

Here is a brief calendar of comin events in Venice which may be of in terest to those planning to visit Ital this year:

June-Oct.	28th Biennial Exhibitio of Art
June	International Popula Song Festival
July-Oct.	Artistic events and fashio shows at the Interna tional Centre of Arts an Costumes, Palazzo Gras
14 July	Traditional Festival of th Redentore
18 August	Night fête on the Gran Canal
1-15 Sept.	17th International Exhib tion of Film Art
2 Sept.	Regatta on the Gran Canal
Sept.-Oct.	International Theatr Contemporary Music Fes tival

AMONGST THE NEW BOOKS

The Struggle for the Border

by Bruce Hutchison

(Longmans Green, Toronto. $6.00)

In Bruce Hutchison's latest work, *The Struggle for the Border*, the author's excellent command of the English language is displayed in a vital, absorbing narrative of Canadian history. Beginning with Champlain's first permanent settlement at Quebec, we are taken down the years and are introduced to the leading personalities who shaped the nation's destiny—often without understanding the long-term effects of their temporary measures—to the present era of St. Laurent and Eisenhower.

As the title of his book implies, Mr. Hutchison gives us an account of the development of the North American Continent through the struggle of Canadian leaders and people to retain their political freedom from the United States and links the story to the laying down of nearly 4,000 miles of invisible, unguarded borderline between the two countries. The author's introduction explains that he has no scruples about interpreting Canadian history as the interplay of circumstance with the qualities and peculiarities of North American leaders; he does not hesitate to use his own considerable knowledge and a variety of standard references to this end, or to show us his statesmen and blunderers as he conceives them to have been, even when some of the evidence for such opinions is uncertain, or lacking. The absence of authentic portraits of Champlain and Frontenac, for instance, does not prevent Mr. Hutchison from imagining their probable appearance as indicated by character, endurance and achievement.

Some readers may find the first two or three chapters of *The Struggle for the Border* rather heavy going, because of the author's constant forecasting of future events arising from the actions of his early heroes: this is particularly true of his picture of Champlain. Once our author has established the framework of his design, however, he fascinates us with his power to weave upon it a vivid pattern of the lives of Canada's great men, each contributing his unique share to the total of accomplishment, not only in Canada, but in North America and the world as well.

The Struggle for the Border itself should stand among Mr. Hutchison's most inspired and inspiring achievements, and further secures his position as one of Canada's foremost writers today.

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Ayorama

by Raymond De Coccola and Paul King
(Oxford University Press, Toronto. $4.00)

This delightful volume was based upon the experiences of a missionary, Raymond De Coccola, who spent twelve years in the area around Bathurst Inlet in the central Canadian Arctic. Mr. King helped him to write this book, undoubtedly translating parts of it, and put it in easy, readable prose. Furthermore, the volume is enhanced by a series of sketches by James Houston of Eskimo activities.

The story itself is a narrative of Father De Coccola. He gives an objective picture of his experiences in this rugged, remote part of the Canadian Arctic, but, best of all, he gives what seems to be a true picture of the Eskimos and their relatively primitive life. Unlike many of his fellow authors who write about the north, he does not attempt to show what a "he-man" he is, nor does he succumb to the unpleasant, but common, practice of making invidious comments about other types of white residents of the north.

Even better than his warm and friendly account of his fellow whites in the north are his descriptions of the people he spent the most time with, the Eskimo. His sketches of various Eskimos he met and sincerely liked treat them as real human beings, not fascinating museum specimens or happy little savages. The book does not deal only with the more pleasant aspects of the Eskimo way of life. Father De Coccola is not afraid to relate the harsh realities and, sometimes, shocking tragedies of this barren land. However, even with these he maintains a balance and objectivity that all authors who write about the north would do well to emulate.

Occasionally one feels the phrase "Ayorama", which may be roughly translated as "It can't be helped", is somewhat overworked and appears more in the book than it perhaps does in real life. Also, one of the authors, has taken poetic licence when he writes of the caribou Eskimo that "their mode of life had not changed since the glacial period." There certainly is no evidence for this statement and there is considerable evidence that many typical elements of the Eskimo mode of life, such as the dog-sled, the bow and arrow, snow house, and the harpoon, are relatively recent inventions that occurred a considerable time after the glacial period. However, these are trivial criticisms.

I would certainly recommend this book as an introduction to the understanding of the Eskimo in the Canadian central Arctic.

RICHARD S. MACNEISH

* * *

Glooskap's Country

by Cyrus MacMillan
(Oxford University Press, Toronto, $3.95)

It is rewarding to find that a book containing myths and Indian legends has proved popular enough to necessitate a reprint. This is the case with Cyrus MacMillan's book which draws extensively on the folklore of Algonquian tribes and the deeds of their culture-hero, Glooskap. Known under a score of names, Glooskap was the demiurge of the cosmologic traditions of the Algonquians. In more recent years, some Indians have believed that their demiurge will re
to earth and rid them of the dom
tion of the white man.

Although rewritten and put
literary form, these tales have
lost their authenticity; and the
tiful drawing of John A. Hall
art and ethnographic informatio

MARCEL R

* * *

Arctic Command

by Roland Wild
(Ryerson Press, Toronto, $4.00)

This book tells the story of Capt
Thomas F. Smellie, grand old man
the arctic seas, whose name is
closely associated with that of
ship, the Hudson's Bay Compan
supply vessel *Nascopie*. The ti
is perhaps misleading, as the bo
covers the whole of the captai
career, from his childhood in Hull a
early voyages in sailing ships, and
are nearly half-way through befo
either the *Nascopie* or the Arc
enter the picture.

The captain's story is absorbi
and his personality is interesting a
unusual. We should be grateful
Mr. Wild, a Vancouver journalist,
giving us an account of the captai
experiences while the man hims
can still be consulted. No ship c
ever again be as important to t
northern settlements as was t
Nascopie. The nostalgia of those w
sailed in her is not only for a galla
ship but for an era that is gone.

Unfortunately the present bo
does little to capture the spirit of t
pre-war era. While pleasant enou
reading for those who do not obj
to the dramatic style ("The captai
blood ran cold"), it is very superfic
in treatment, and the author displa
a complete lack of the kind of bac
ground knowledge that might ha
brought life to its pages. An i
pression of having been written
haste is heightened by quite freque
slips of grammar or sense whi
could only be due to carelessness,
for instance the astonishing phen
menon alleged to have occurred du
ing the launching of the *Bayrupert*
"the grinding of her bottom on t
water" (p. 104).

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M. Wild attempts little description of the work of ships in ice, which is probably wise, but the book might have been more interesting if he had been able to do so. One point he does mention is the fact, always mystifying to laymen, that fresh water may be obtained from old sea ice. His explanation, however, is a strong contender for neatest trick of the week (the italics are the reviewer's): "The sun would melt a little hollow in the middle of a flow (*sic*), and *at the same time* the freezing would extract the salt." (p. 88).

The book contains many inaccuracies, some perhaps of little importance, others more serious. On page 157 we are told that Amundsen, on his voyage through the Northwest Passage, "drifted for three years in these hazardous waters, exposed as he left M'Clure Strait to 800 miles of open sea before he reached the comparative protection of the seaboard of Alaska". Amundsen, of course, used almost the same route as the *Nascopie* and *Aklavik* in 1937, the only difference being that he went down Peel Sound instead of Prince Regent Inlet and avoided Bellot Strait. He was never in M'Clure Strait, and the reason he took three years was because he spent two winters in King William Island, from choice not necessity, doing magnetic and exploratory work.

The references to an unfortunate and rather muddled jealousy of the R.C.M.P. vessel *St. Roch* introduce an unpleasant note that might have been omitted. Both ships did fine work, though never actually in the same area. The *St. Roch* spent all her working career in the Western Arctic, only passing through the *Nascopie*'s territory on her two voyages through the Northwest Passage.

MOIRA DUNBAR

* * *

World Regional Geography
by Oliver H. Heintzelman and Richard M. Highsmith, Jr.
(Prentice-Hall, Inc., New York, $6.75)

This is a new text designed for use in the early years at university. It presents a geographical appraisal of the world, which the authors have divided into fourteen types of regions according to similarity of climatic characteristics. The first chapter (*Geography, The Correlative Science*) gives something of the authors' "geographical philosophy," but the bulk of it is concerned with a sketch of factors of environment on a global basis. Only the last three paragraphs of the chapter deal with the basis of the fourteen-fold division, when the authors tell us that "when an analysis is made of the interrelated factors of the man-nature complex, climate appears to play the dominant rôle." One is left to suspect that the climatic regions are based on Koeppen, especially as the list of chapter references includes Finch and Trewartha's *Elements of Geography* and James' *Geography of Man*.

Each of the remaining chapters is concerned with one of the major regions and each concludes with an "outlook" for the future. The material is well organized and logically presented. The photographs were obviously chosen with great care and are a delight to study. The maps are technically well executed; they are simple, clear, and on a uniform basis throughout the book. But the surprising aspect of the maps is that none of them carry a legend and some of them no scale. It is possible, however, after a certain amount of page-turning, to deduce, for example, that a cross-pattern indicates highlands, and that an irregular close-dot-pattern indicates tropical deserts sometimes and dry-summer subtropics at others. Perhaps this was an exercise intended by the authors. It is certainly an engrossing one.

Even closer inspection of some of the maps reveals further points which puzzle this reviewer. Half of page 325 is devoted to a figure entitled *Physiographic diagram of Canada*. Yet it does not show any of the political boundaries of Canada; it completely excludes the Queen Elizabeth Islands and the Huron-Ontario lowlands (where some 20% of Canadians live) and it shows but five settlements (Churchill, Edmonton, Winnipeg, Montreal, and Juneau) one of which is not even in Canada!

The text also includes some challenging statements, such as "Fairbanks . . . is the largest centre within the North American (subarctic) region, with about 6,000 inhabitants" and "only in Eurasia do any (settlements) exceed 10,000 in population." Yet the map of the subarctics of North America includes Arvida (pop. 11,078), St. John's (pop. 52,873) and Corner Brook (pop. 10,276), while the text describes some of the economic activities at these places! Somewhat similarly, the chapter on *Polar Lands* mentions the word minerals but once and then very incidentally. Yet the map entitled *The Polar Lands of North America* shows only one settlement in Canada — Port Radium! It omits the larger islands in Foxe Basin and several of the Queen Elizabeth Islands. If Canada is thus somewhat casually considered, one cannot help but read with caution the treatment of those parts of the world more remote from Oregon, where the authors are teaching.

N. L. NICHOLSON

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Adventuring with Beebe

by William Beebe

(Little, Brown & Co., Toronto, $5.00)

William Beebe, the famous American naturalist and explorer, has moulded the highlights of forty years of adventure into this highly interesting and well-written book. The first section deals with Bermuda, its geological history, coral reefs, and bird and fish life which the author "discovers" while hiking along the shore and skin-diving in the warm clear water. He recaptures the first thrill of the descent with Otis Barton in the bathysphere to a depth of 1,246 feet where hatchet fish, "flame-throwing" shrimps, and other bizarre creatures drift about in the brilliant blue-black abyss. In the second section the *Zaca* cruises slowly along the Pacific coast of Mexico and Central America where Beebe marvels at the black-footed albatross, the soaring pelicans and cormorants, the giant whale shark, and the peculiar fauna of lonely wave-battered Clarion Island. He touches the mainland at several places scarred by volcanic eruption and earthquake and, braving spiny sea-urchins, biting sand-flies, fire ants, impenetrable cactus, and other tortures, he learns much about coral life, fish-eating birds, crocodiles, and constrictors. A walk through a vil market-place and a visit to a ci add touches of human interest to adventure. Along the shores of C Rica Beebe captures rare fish and usual specimens of sea life in quantities but is humbled by the g insects and tall trees of the Pa coast jungle The final section i intimate study of the primitive h zin bird, the singing catfish, and myriad microfauna of the jungle fl of British Guiana. In the "Bay Butterflies" Beebe ponders the rid of the seemingly self-destructive s ward migration of these brig winged insects.

What might have been a humdr collection of adventure stories is h together in smooth-flowing continu by Beebe's remarkable literary sty His inquiring mind approaches ea discovery with a sense of wonder a of appreciation of the marvel of evo tion and the unending cycle of li Beebe is master of the metaphor, t striking simile, the use of contra and the bizarre situation in buildi interest into each chapter. His vie point of nature is admittedly anth pomorphic, but the non-scientist w find the reading all the better for

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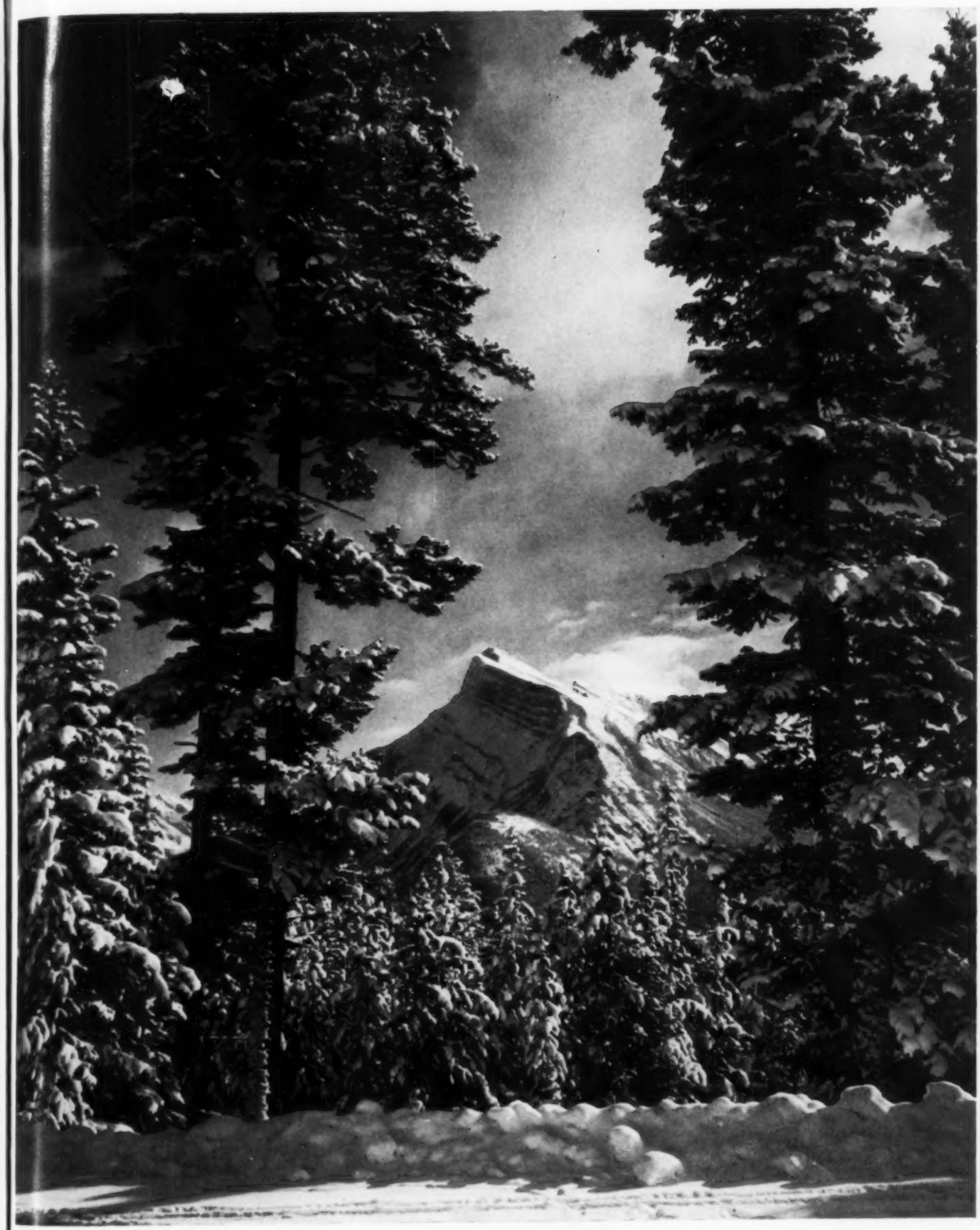

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